# THE IRON TRADE REVIEW

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## THE WEEK IN IRON CIRCLES.

### THE MARKET AT LARGE.

The past week has brought a very considerable contribution to the prosperity of the iron trade in 1903. The activity has been most marked in pig iron, but it has also been sufficient in finished lines to give some of the mills a tonnage of new business exceeding the amount of their shipments. The announcement by the largest Southern furnace interest that its books are open for 1903 orders, beginning with March, prices on a basis of $17 at furnace for No. 2 foundry iron, tells of the strength of the inquiry for forward deliveries that the furnaces have been meeting lately, as well as the extent to which in this instance the business booked for 1902 will lap over into the following year. The Chicago District reports sales of 100,000 tons of pig iron in the past week. Sales in and around Pittsburg amounted to 40,000 tons of foundry and malleable Bessemer irons, and it is estimated that fully 100,000 tons of iron for foundry use has now been sold in that district for delivery next year. In the East there have been round sales of Southern iron for next year and Cincinnati notes a marked increase in inquiries and sales for 1903 delivery. Prices for next year are not uniform, as low as $16.50 and as high as $18 being quoted by Southern furnaces for No. 2, while Northern furnaces quote from $21 to $22 at furnace. There is a closer scrutiny than ever for signs that consumption will decrease in the near future because of the high price for iron, but none are plain enough yet to be cata logued, though the danger is very generally recognized. In the case of a number of pig iron producers, half their capacity for the first six months of 1903 is already sold; few have sold less than one-third their probable output in that period. Pittsburg reports a sale of 30,000 tons of Bessemer iron, delivery extending through 1903, at $18 at furnace, or $1.50 above the basis of sales for the first quarter made a few months ago to the United States Steel Corporation. In the buying of foundry and malleable pig iron for next year large interests have led, one important consumer having placed an order for its requirements from April to December, besides buying certain forms of finished material for all of next year. There is nothing new in the steel situation. Independent finishing mills cannot make money at the present prices for billets and rolled material, and with steel somewhat weaker through resales are disposed to wait for a further decline. The situation in the heavier forms of finished steel grows stronger. Rail buying continues, the B. & O. order for 40,000 tons equally divided between the steel corporation and the outside group of mills, being the latest of importance. The Chicago mill is practically sold to Oct. 1. In the plate market shipyard and agricultural orders have added much to the tonnage booked for 1903. The consolidated lake yards have now 28 vessels on their books, these representing 70,000 tons of plates and shapes. For locomotive and agricultural engine requirements there has been good contracting. Some Central territory manufacturers in the latter line, who have waited for assurance on the crops, now find that they cannot get deliveries on some forms of material wanted in the late fall, before January or February. Chicago reports sales of 40,000 tons of bars in the past week, and this has served to remove the weakness recently noted in bar iron in the West. Structural orders, on which as well as on plates the official figures are disregarded even on 1903 business by some sellers, are still a strong feature. One structural mill took 18,000 tons in Chicago last week. The talk of consolidation of Mahoning and Shenango Valley furnaces is revived, but important interests whose furnaces would be included in any such move know nothing of it. Valuations on the basis of present prosperity would be prohibitive. The action on the Amalgamated Association's proposal to accept a reduction of 25 percent on labor entering into tin plates for export, to replace drawback plates, has been favorable in a majority of the lodges reporting, though there are some negative votes.

### PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, July 23.

Consumers continue to be interested in pig iron deliveries through the first half of next year, and contracts for fully 40,000 tons of foundry and malleable Bessmer have been placed for forward delivery during the past week. One sale of 30,000 tons of standard Bessemer for delivery through 1903 is also reported at a price which indicates that the furnaces are disposed to be fair on deliveries so far in the future. No less than 25,000 tons of No. 2 foundry have been sold during the past few days for delivery to July 1, 1903, at prices ranging from $21.50 to $22, while the sales of malleable Bessemer aggregate fully 15,000 tons at prices ranging from $21 to $21.50 at the furnace. The 30,000-ton lot of Bessemer iron referred to was sold at $18 at the furnace, thus establishing a new record price on this iron for delivery through 1903. While the furnaces are asking $20.50 for delivery through the first quarter, this can be shaded for the second quarter and owing to the uncertainties of the second half of the year the sellers regarded $18 to be an equitable price, conditions considered. It is estimated that no less than 100,000 tons of foundry iron has been sold by Northern furnaces for delivery through the first half of next year to consumers in this district at prices averaging $21 delivered, Pittsburg. This average is much higher than the average price in 1899, despite the fact that iron sold fully $2 a ton higher than it is quoted today. Furnacemen generally report that the average price per ton of iron on their books at present is much higher than during the boom in 1899 and with present prices ruling the future business this high average will no doubt continue for the next year.

The Tennessee Coal, Iron & Railroad Co. has opened its books for the reception of orders for foundry iron for delivery beginning March next year, and continuing through the month of June at $17 at the furnace, equivalent to $21.15, delivered Pittsburg. The other Southern furnaces are quoting the same price on No. 2 foundry for delivery through the entire first half, this having been agreed upon at a meeting of Southern producers held in New York last week. The reason assigned for not taking business through January and February by the Tennessee company is on account of the labor troubles in the South greatly curtailing the normal output, and in order to guard against any shortage the output for these two months is reserved for the consumers whose contracts do not expire until January, 1903.

Reports concerning a consolidation of the merchant furnaces in the Valleys are again appearing, but in this instance the furnacemen are in total ignorance of the movement. Under present conditions the consolidation is almost entirely out of the question as the furnace operators would place fabulous prices on their plants, present earning capacities considered.

In finished lines the situation remains practically unchanged. A fair amount of business continues to be placed with the mills and with few exceptions deliveries cannot be promised in less than five or six months. Some new business is also being placed for delivery next year, but the tonnage is not nearly as large as it was several months ago. Consumers are no doubt awaiting developments, and it will probably be September before any heavy buying movement sets in for 1903 deliveries.

PIG IRON.—The demand for all grades of iron for prompt

shipment continues strong, and despite the high prices that are being offered by some consumers the iron is not to be had. Nearly all the foundries in this district are unable to secure sufficient iron to meet their requirements, and in Bessemer all of the furnaces in the Mahoning and Shenango Valleys are several months behind on their deliveries. While standard Bessemer is quoted at $21 per ton for delivery through the remainder of the year small lots for quick shipment command from $21.50 to $21.75 at the furnace. For delivery through the first quarter of next year $20.50 is quoted. We note the sale of 30,000 tons of Bessemer for delivery through 1903 at $18 at the furnace. The buying of foundry iron through the first half of next year continues unabated and furnaces report that inquiries concerning this delivery are very heavy. The coke situation still proves troublesome to the furnace operators, and a number of furnaces are reported banked in Southern Ohio. While none of the furnaces in this district have been able to accumulate any quantity of coke none has been forced to bank during the week. We revise quotations as follows:

| | |
|---|---|
| Bessemer, Valley | $21 00 to 21 75 |
| Bessemer, Pittsburg | 21 75 to 22 50 |
| No. 1 Foundry | 23 50 to 24 00 |
| No. 2 Foundry | 21 75 to 23 00 |
| No. 3 Foundry | 21 25 to 21 75 |
| Gray Forge, Pittsburg | 20 75 to 21 00 |
| Chilled Basic, Valley | 20 25 to 21 00 |
| Chilled Basic, Pittsburg | 21 50 to 21 75 |

STEEL.—There is very little doing in either Bessemer or open-hearth billets. Consumers still refuse to pay the prices the mills are asking except when pressed and until the producers name better prices than they are quoting at present the market will remain very quiet. Bessemer billets are $33 to $33.50 at mill, while open-hearth billets are quoted at $34 to $34.50 per ton. The rod market is quiet and quotations are nominally $36.50 at mill.

FERRO-MANGANESE.—There is little doing in ferro and we quote German at $52.25 and English at $52.50, delivered anywhere in this country. Domestic ferro is practically unobtainable.

SPELTER.—The market continues upward and prime Western grades are now 5.15c to 5.20c, delivered, Pittsburg.

MUCK BAR.—We note the sale of 3,000 tons of neutral muck iron at $36.50 at the mill.

SKELP.—The market continues quiet and we quote grooved and sheared iron skelp at 2.15c to 2.20c and steel at 2.25c. Iron skelp continues to be offered here by Eastern mills.

RAILS.—Inquiries for standard sections continue to come to the mills, and as orders stand Eastern and Central Western mills are now able to make better deliveries next year than Western mills. We quote as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $46; 12 pounds, $44; 16 pounds, $42; 20 pounds, $40; 25 to 40 pounds, $38 to $40. Track material: Spikes, 2c to 2.05c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

BARS.—The market in both iron and steel bars continues firm despite the slight weakness heretofore reported in the former in the West. In that section higher prices are now quoted. Deliveries on certain sizes can now be made by some of the local mills within three months, but on running business it is not probable that better than four or five months can be done. We continue the following quotations: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c to 1.90c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2.25c and upwards.

PLATES.—There is no let up in the demand for plates, and the situation grows stronger every day. There is already every indication that there will be a pronounced scarcity of plates before the end of the year. Some of the mills refuse to take business below 1.85c to 2c, although agreed quotations are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

PIPES AND TUBES.—Some of the smaller mills are offering concessions to secure business, and concessions from the quotations below amounting to as high as 4 percent are being made by some of the mills. Prices are, however, being firmly maintained by the National Tube Co. Quotations to jobbers in carload lots, with freight added to destination, are as follows:

MERCHANT PIPE.

| | Black. Per cent. | Galv. Per cent. |
|---|---|---|
| ⅛ to ⅜ and 11 to 12 inches | 60 | 48 |
| ½ to 12 inches | 67 | 55 |

Discounts to consumers in carload lots, Pittsburg, are as follows:

BOILER TUBES.

*Steel.*

| | Per cent. |
|---|---|
| 1 to 1¾ inches | 45 |
| 2¼ to 5 inches | 60½ |
| 1¾ to 2¼ and 6 to 13 inches | 52½ |

*Iron.*

| | Per cent. |
|---|---|
| 1 to 1¾ inches | 42½ |
| 2¼ to 5 inches | 50 |
| 1¾ to 2¼ and 6 to 13 inches | 40 |

CASING.

| | S. and S. Per cent. |
|---|---|
| 2 to 3 inches | 58 |
| 3¼ to 4 inches | 60 |
| 4¼ to 12¾ inches | 63 |

SHEETS.—Owing to the high price of spelter the mills are finding it extremely unprofitable to continue to offer galvanized sheets at present prices, and it is probable that a slight advance will be made unless the spelter market soon weakens. Black sheets continue fairly strong with a good demand. We make the following quotations, carloads: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets, in carload lots to consumers, are quoted at 3.05c for Nos. 10 and 11, 3.45c for Nos. 18 to 21, 4.20c for No. 27, and 4.50c for No. 28. Galvanized sheets, mill shipments in carload lots to consumers are as follows: Nos. 10 and 11, 3.05c; Nos. 12 to 14, 3.15c; Nos. 15 to 17, 3.25c; Nos. 18 to 21, 3.45c; Nos. 22 to 24, 3.75c; Nos. 25 and 26, 4c; No. 27, 4.25c; No. 28, 4.50c.

STRUCTURAL MATERIAL.—The market continues quiet except for small lots for immediate delivery for which the demand is large. For future delivery the following prices are made: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—Considering the season the market is strong. Many mills are idle, however, undergoing repairs in anticipation of a large trade in the fall. We make the following quotations: Wire nails in carload lots, $2.05 per keg; smaller lots, $2.10 and $2.15; plain wire, $2 in carload lots and $2.10 in less than carload lots to retailers; galvanized wire, $2.40 in carload lots; polished staples, $2.20, and galvanized staples, $2.60; painted barb wire, $2.60, and galvanized, $2.90. These prices are quoted on a Pittsburg base, plus the actual freight to destination. Cut nails are held at $2.05 in carload lots and $2.10 in less than carload lots, Pittsburg, plus freight to destination.

MERCHANT STEEL.—The market continues very strong and prices are being well maintained. We quote: Turned, cold rolled ground shafting in carload lots is quoted 47 off, and in less than carload lots, 42 off; tire steel, 2.25c to 2.30c; toe calk, 2.35c to 2.45c; sleigh shoes, 2.25c to 2.35c; machinery steel, 1.70c; smooth machinery steel, 1.75c. Tool steel, 7 cents and upwards.

OLD MATERIAL.—The Erie Railroad has introduced quite an innovation in the sale of its old material. Heretofore tonnage lists of all the material on hand were sent out to all the dealers in old material and they were permitted to bid on what they desired. This method is still in vogue among nearly all the roads. The Erie, however, desires to know what the dealers want to buy and what they are willing to pay, without

stating the material or tonnage on hand. How the dealers will treat this movement remains to be seen as it prevents all speculation on the material in the hands of the railroads. Should the Erie be successful it is probable that the remainder of the roads will follow its example. It will compel the dealers to buy before they sell their product which is the reverse of much of the practice in vogue today. Our quotations, gross tons, are as follows: Cast scrap, $18 to $19; heavy melting stock, $21 to $21.50; No. 1 wrought scrap, $22 to $22.25; light rails, relaying purposes, $34 to $38.

COKE.—Furnace coke for prompt shipment to Eastern furnaces commands $4 to $4.25 at the ovens and many of the producers are taking advantage of these high prices thus cutting down deliveries to their regular trade. The deliveries to the Valleys are not nearly large enough and none of the furnaces have sufficient stocks on hand to tide them over the slightest interruption in deliveries. The demand for foundry coke is also extremely heavy and good coke for prompt shipment commands from $3 to $3.50 per ton. For the week ending Saturday, July 12, the output of the Upper Connellsville region amounted to 249,510 tons and that of the Lower to 37,040 tons. This was an increase over the previous week of about 23,000 tons. The shipments for the week also exceeded those of the previous week by fully 500 cars.

## CHICAGO.

OFFICE OF *The Iron Trade Review*, 519 MONADNOCK BLOCK, July 22.

About all the product of the largest Western steel producers that can yet be sold and delivered in 1902 are a few light rails for fourth quarter shipment. Hence present business has to do mainly with 1903. Trading for next year's shipments continues very heavy. It has been especially pronounced in steel rails, pig iron, structural material and in iron bars, though special activity in the last named has now mainly subsided. Most but not all of the large Western railroad companies have now covered for their 1903 steel rail wants. An inquiry for 100,000 tons this week will have to go East, because the Western mills can not make the necessary deliveries. Orders already booked by Central and Western rail mills amount to about 800,000 tons, and in this district 75 percent of capacity is booked, thus providing a market for output up to about Oct. 1. The largest producer of structural shapes has sold during the week 18,000 tons of material, fairly well split up among bridge, car and building requirements. There is a very active movement on in pig iron. All the large melters have come in for their wants during the first half of 1903 or are coming in. And the middle class of consumers are also present in large numbers. Large as were the transactions of the previous week, those for the week just closed are fully as large. It is moderate to fix the total for the week at 100,000 tons. All the important sellers in the market are participating in the activity. Iron bars have been marked up by the large producers and the advance was preceded by important transactions. Sales of iron bars last week were probably 40,000 tons.

PIG IRON.—The output of one of the Western pig iron furnaces has been entirely sold up for the first half of 1903. Others are rapidly approaching that condition. Buying has been almost of a clamorous nature. The inquirers no longer ask the price of iron but only for the deliveries desired. The large orders have been divided up between Northern and Southern sellers. Representatives of furnacemen, who have gone out on the road, have found it easy to close with nearly every foundryman visited. But most of the big business has resulted from the seeking of the seller by the buyer. Lots of 5,000 tons have been common, and larger amounts have not been wanting. These transactions follow the 20,000 and 30,000 ton orders noted a week ago. The aggregate during the week has been easily 100,000 tons. Prices are firm at the quotations of the previous week. Southern iron has been selling on the basis of $17 to $17.50 for No. 2 foundry, Local foundry No. 2 is quoted $21.50 to $22. It is noted that some of the orders are for larger tonnage than the buyers ever placed before for the same length of time of delivery. For quick shipment premiums of $2 or $3 are still common. The demand for spot iron may be a trifle easier but prices are strong. The ending of the Southern coal miners' strike did not bring full supplies of fuel and some furnaces are still out on account of a lack of fuel. Quotations for future shipments follow:

| | | | |
|---|---|---|---|
| Lake Sup. Charcoal | $24 00 to $24 50 | Southern Coke No. 4 | $19 15 to $20 65 |
| Local Coke Fdy. No. 1 | 22 50 to 23 50 | Southern No. 1 Soft | 20 65 to 22 15 |
| Local Coke Fdy. No 2 | 21 50 to 22 50 | Southern No. 2 Soft | 19 65 to 21 15 |
| Local Coke Fdy. No. 3 | 22 00 to 23 00 | Southern Gray Forge | 19 15 to 20 65 |
| Local Scotch Fdy. No. 1 | 22 00 to 23 00 | Southern Silveries | 22 15 to 23 15 |
| Local Scotch Fdy. No. 2 | 21 50 to 22 50 | Jackson Co. Silveries | 24 50 to 26 50 |
| Southern Coke No. 1 | 20 65 to 22 15 | Ohio Strong Softeners | 24 10 to 24 60 |
| Southern Coke No. 2 | 20 15 to 21 65 | Alabama Car Wheel | 24 65 to 25 10 |
| Southern Coke No. 3 | 20 65 to 22 15 | Malleable Bessemer | 23 00 to 23 50 |

BARS.—The tone of the bar iron market is decidedly stronger, owing to the advance to 1.95c made by the leading producers. All other sellers have not advanced to the same level and hence the future quotation is not without some question. There were heavy transactions in bars just previous to this rise, the buying being widely distributed and including deliveries mainly for the first half of 1903. An effort has been made within the past two weeks to combine six Western bar producers into one company. So far the plans have not succeeded but efforts have not been wholly abandoned. We quote Chicago delivery, Bessemer steel, 1.75c to 1.85c; angles, less than 3x3, 1.85c; iron, 1.85c to 1.95c; hoops, 2.15c. Prices out of store: steel, 2c to 2.10c; iron, 2.20c to 2.25c; hoops, 2.40c to 2.45c; angles, 2.50c to 2.60c.

SHEETS.—A moderately good demand for sheets is reported. Concessions by some of the smaller mills are reported but the general list is not reduced. We quote No. 27 black, mill shipments, Chicago delivery, 3.15c to 3.25c; galvanized, 4.40c to 4.50c; out of store, No. 27 black, 3.35c to 3.50c; galvanized, 4.60c to 4.75c.

STRUCTURAL MATERIAL.—Something like 20,000 tons has been sold during the past week and there are inquiries for nearly the same amount now in the market. Bridge builders have been especially active in providing for their future wants and car builders also have been good buyers. All this tonnage is for 1903 shipment. Store trade shows no decrease. We quote mill prices as follows: Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; structural angles, 3x3 to 6x6, 1.85c; angles, channels and tees, smaller than 3 inches, 1.85c base; plates, 1.75c. Prices on lots from store are based on the necessities of buyers and according to the size of order. Store prices vary from 2½ to 4 cents a pound.

BILLETS.—The market shows no weakening here. The transactions of the past week have been restricted mainly to carload business, which is quoted at about $32.50, for foreign Bessemer product. Representatives of German makers are said to have been recently trying to negotiate for billets directly with consumers, though it can not be learned with what success.

RAILS AND TRACK SUPPLIES.—A new spike mill is needed in the West to take care of business offered and the erection of one at Joliet is under consideration. Track supplies of all kinds are sharing in the activity displayed in rails. The inquiry for the latter continues. There have been large purchases during the week and the buying has now attained such proportions that the Eastern mills are receiving an increased percentage of inquiries. The local mills by common report are said to be sold up to Oct. 1, 1903. Inasmuch as some of these purchases are for delivery during the last quarter of the year the mills still have open some capacity for shipment in July. This week a large inquiry for requirements a little earlier had to be turned over to Eastern mills for consideration. Prices are without change. We quote standard rails $28; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate sizes; out of store, $45 to $50; splice bars, 2.25c; spikes, carload lots, 2.45c to 2.55c; track bolts 3½x3¼, with square nuts, 2.85c per 100 pounds; with hexagon nuts, $3, with usual differentials for other sizes.

MERCHANT STEEL.—The mills are turning down some business every week. The inquiry is not large, however, for all large consumers are covered until well into next year. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.95c to 2c; open-hearth spring steel, 2.65c to 2.75c; sleigh shoe, 1.75c to 1.80c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.40c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.25c to 2.35c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 percent to 10 percent

higher; cold rolled shafting, carload lots, 50 percent off, Chicago; less than carload lots, 45 percent off, Chicago.

CAST IRON PIPE.—Business is brisk in medium sized orders and prices are firm with an upward tendency. Four-inch water pipe is quoted $34.50 to $35 and 6-inch and larger sizes, $33.

MERCHANT PIPE.—Conditions are without change. There is dullness, comparatively speaking, in small sizes while large pipe is scarce. Boiler tubes are meeting with a brisk demand from all kinds of consumers. Prices are as follows:

MERCHANT PIPE, RANDOM LENGTHS.

| | Black Per cent. | Galv. Per cent. |
|---|---|---|
| ⅛ to ⅜ in. | 58 | 45 |
| ½ to 12 in. | 65 | 52 |

BOILER TUBES.

*Steel.*

| | Per cent. |
|---|---|
| to 1¼ in. | 35 |
| 1¼ to 2½ in. | 45 |
| 2¾ to 5 in. | 55 |
| 6 to 13 in. | 47½ |

*Iron.*

| | Per cent. |
|---|---|
| ¼ to 1¼ in. | 35 |
| 1¼ to 2½ in. | 32½ |
| 2¾ to 5 in. | 42½ |

PLATES.—There are no plates to be sold locally for the balance of the year. Store trade is excellent, jobbers being wholly unable to fill all inquiries. The tone is strong. We quote mill prices, Chicago delivery: Tank steel, ¼-inch and heavier, 1.75c to 2.15c; flange steel, ¼-inch and heavier, 1.85c to 2.25c; from stock, tank steel, ¼-inch and heavier, 2.30c to 2.50c; 3-16, 2.40 to 2.60c; No. 8, 2.45c to 2.65c; flange steel, 2.50c to 2.60c.

WIRE AND WIRE NAILS.—There is seasonable trade of gratifying proportions. Miscellaneous inquiries are both numerous and for considerable tonnages. We quote: Smooth wire carloads, $2.15; painted barb wire, $2.75; galvanized barb wire in carload lots, $3.05; wire nails, carload lots, $2.20; staples, carload lots, $2.30; jobbers' prices to retailers, 5 cents higher than above for carload lots, and 10 cents higher for less than carload lots.

COKE.—The strikes in the West Virginia mines has a tendency to keep the coke supply from that state very low. In the Connellsville region it seems also to be a question of sufficient labor rather than one of cars. The market continues strong. We quote 72-hour Connellsville foundry, $5.75; for spot delivery, $6.00; Virginia and West Virginia coke, $5.25 to $5.75.

OLD MATERIAL.—There is a very brisk demand for cast scrap because of the scarcity of pig iron and the tendency of the market is upward. Steel melting stock also has many prospective buyers and comparatively little is for sale. The market generally is firm and there are occasional advances. We quote gross tons as follows:

| | | | |
|---|---|---|---|
| Old iron rails | $24 00 to $25 00 | Relaying rails | 31 00 to 32 00 |
| Old steel rails, long lengths | 23 00 to 24 00 | Old wheels | 20 00 to 21 00 |
| Old steel rails, short lengths | 18 00 to 19 00 | Heavy melting steel | 19 50 to 20 50 |
| | | Mixed country steel | 15 00 to 16 00 |

The following are selling prices per net ton:

| | | | |
|---|---|---|---|
| No. 1 R. R wrought | $20 50 to $21 50 | Steel axles | $22 00 to $23 00 |
| No. 2 R. R wrought | 19 00 to 20 00 | Cast borings | 10 00 to 10 50 |
| Dealers' forge | 16 00 to 17 00 | Wrought turnings | 13 50 to 14 00 |
| No. 1 busheling | 14 00 to 15 00 | Iron axle turnings | 14 00 to 14 10 |
| No. 1 R. R & mch. cast | 15 00 to 16 00 | Steel axle turnings | 13 50 to 14 00 |
| Railway malleable | 15 50 to 16 50 | Stove plates | 11 00 to 11 50 |
| Country malleable | 13 50 to 14 50 | Old iron splice bars | 21 00 to 21 50 |
| Iron axles | 24 50 to 25 00 | | |

## CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, July 23.

The dispatch of vessels from northern ports has been more satisfactory the past week and ore is coming down rapidly, as fast, in fact, as it can be handled at Lake Erie ports. There is already some speculation as to whether all the ore sold can be handled before navigation closes. There will be plenty of vessels, but there is some question as to railroad facilities. The opinion is expressed that the owners of a few large mines have oversold their output, but they do not admit that this is true. There is a fair number of inquiries for ore for this time of the year.

PIG IRON.—Activity in the pig iron market is all on the side of the buyers. A surprising number of foundries are finding that they will not have enough iron to meet their demands for the year and are having great difficulty in getting supplies even at fancy figures. The price of 1902 iron is merely a matter of policy and conscience of the sellers and as high as $25 is being paid for No. 2 foundry at the furnace, while old customers may be so fortunate as to have limited orders filled at $23. The prices paid for Southern iron for early delivery are not much lower. Furnaces generally are sold out not only for this year but have orders for about half of their product for the first half of next year. We quote the Cleveland market as follows for forward delivery, the lower figures on foundry iron being for shipment in the first half of 1903 and the higher figures for deliveries in the first two or three months of the new year:

| | | | |
|---|---|---|---|
| Bessemer | $21 75 to $22 25 | Scotch No. 1 | $22 25 to $22 75 |
| No. 1 Strong F'dry | 22 25 to 22 75 | Scotch No. 2 | 21 75 to 22 75 |
| No. 2 Strong F'dry | 21 75 to 22 25 | Gray forge, Valley | 20 00 to 20 50 |
| No. 3 Foundry | 21 25 to 21 75 | LakeSuperior charc'l | 23 00 to 24 00 |

FINISHED MATERIAL.—The demand for plates is still the feature of the finished material market. Several companies manufacturing argicultural machinery are having a hard time in getting plates for traction engines, etc., as ordering was too long delayed while awaiting crop reports. Deliveries in some cases cannot be had short of January or February. Several Ohio agricultural concerns are reported in the market this week for plates, bars and merchant steel, the crop outlook being regarded such as to warrant good purchases. Prices of tank steel range from 1.70c to 1.85c Cleveland, according to deliveries. There is not quite such a rush for bar iron as there was, as the tendency is at present prices to substitute steel. The base price for bar iron is 1.80c Pittsburg with premiums for early delivery. The American Locomotive Co. has made considerable purchases of bar iron for delivery next year and has also gone into the market for its requirements in other lines.

We continue to quote steel bars at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg. Sales out of store, Cleveland, are on a basis of 1.90c to 2c. The market in sheets continues to be quiet with supply ample for the demand. We quote 2.10c to 2.15c Cleveland for 3-16-inch and heavier. Cleveland prices are on the following basis on mill sales of black sheets: No. 24, 2.90c to 3c; No. 26, 3c to 3.10c; No. 27, 3.10c to 3.20c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3c; No. 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 22-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c, for one pass cold rolled. On galvanized sheets Cleveland prices to consumers are as follows for carload lots: Nos. 10 and 11, 3.15c; Nos. 12 to 14, 3.25c; Nos. 18 to 21, 3.55c; Nos. 22 to 24, 3.85c; No. 27, 4.53c; No. 28, 4.60c. Recent vessel contracts, which are being added to with every week, have made heavier demand upon structural mills as well as plate mills and the tonnage of shapes for forward deliveries is accumulating. We continue to quote 1.70c Cleveland for beams and channels for delivery in 1903, business for 1902 being through jobbers at prices from 2½ to 3½c according to sizes and quantity.

OLD MATERIAL.—There has been a fair demand for scrap the past week. Mills are making only moderate purchases, however, and the market in old material is quiet with prices stationary.

| | |
|---|---|
| Old iron rails | $ 26 00 to 27 00 |
| Old steel rails (6 ft. and over) | 22 00 to 23 00 |
| Old steel rails (6 ft. and under) | 19 00 to 20 00 |
| Old car wheels | 18 00 to 19 50 |
| No. 1 R. R. wrought scrap | 21 00 to 22 00 |
| Mill scrap | 20 00 to 20 50 |
| No. 1 machine cast scrap | 17 00 to 18 00 |
| Iron axles | 28 00 to 29 00 |
| Axle turnings | 18 00 to 18 50 |
| Wrought turnings (free from cast) | 14 00 to 14 50 |
| Cast borings | 9 50 to 10 50 |
| Uncut wrought iron boilers | 11 00 to 12 00 |
| Steel boiler plates | 16 00 to 17 00 |
| Grate bars | 11 50 to 12 50 |
| Pipes and flues (clean) | 17 00 to 18 00 |
| Tank iron | 17 00 to 18 00 |
| Hoop and band iron | 13 50 to 14 50 |
| Sheet iron | 11 50 to 12 00 |
| Wrought drillings | 13 00 to 13 50 |
| Malleable iron | 17 00 to 18 00 |
| Stove plate | 13 00 to 14 00 |
| Heavy steel | 18 50 to 19 50 |

## CINCINNATI.

July 21.

There is a continued increase in the amount of business being done for next year's delivery. In the way of pig iron and finished material contracts are being let more largely for 1903 than any time previous, and the bulk of the business now being

done goes on next year's rather than on this year's books. Of course, people who are in the market for structural material have been buying for some months for 1903 delivery, but in pig iron until recently the bulk of the business has been for delivery during the remainder of this year. Now, however, the business done is mostly for 1903. Manufacturing lines are all busy and consumers of every variety of raw material and finished material are still in what they all unite in saying is the best business that they have had in years.

General conditions in this district all point to a continuance of the present situation. Building was never so active; manufacturing lines were never so busy and jobbers say that they never had such a good outlet for their fall trade. There are being projected many new enterprises that will increase the consumption of pig iron in this district. One is a large foundry that is expected to supply castings for three of the largest machinery concerns in the world.

PIG IRON.—The latter part of the week Southern producers that have been selling at $16.50, Birmingham, advanced the price to $17. This is on iron for delivery during 1903. On iron for delivery during the remainder of this year, such concerns as have iron to sell at this time are getting almost anything they want, and while it is expected that about Sept. 1 more iron will come into the market for delivery the last three months of this year the amount now offering is very small. The outlook among the Southern furnaces is better than it was, owing to the settlement of the strike and the blowing in of a number of furnaces. When the rest of the furnaces that have been banked or blown out are started up again the situation will be materially relieved.

There have been rather good sales of iron during the past week, one agent having placed 12,000 tons in two days for delivery during the first half of 1903. The inquiry is good from all consumers and as far as iron for this year is concerned is coming from the most unexpected quarters. Concerns that were thought to have covered and more than covered for the year have been buying and have been paying almost any price asked. Transactions in Southern iron have not been very large, being mainly for from 100 to 1,000 tons with a few orders for 1,200 to 1,500. In Northern irons there have been numerous orders placed for lots ranging from 500 to 1,000 tons. Iron is still being sold subject to an advance in Southern freight rates. Prices at Cincinnati for 1902 and 1903 delivery may be quoted as follows, the minimum representing the iron obtainable for 1903 delivery:

| | | | | | |
|---|---|---|---|---|---|
| Southern Fdy. No. 1 | | $20 25 to 21 75 | Gray Forge | | $19 00 to 20 00 |
| " | " | 2 19 75 to 21 25 | Northern Fdy. No. 1 | | 24 10 to 24 60 |
| " | " | 3 19 25 to 20 75 | " | 2 | 23 60 to 24 10 |
| " | " | 4 18 75 to 20 25 | Southern C. W. iron | | 25 25 to 25 75 |
| So. Fdy. No. 1 soft | | 20 25 to 21 75 | Malleable coke iron | | 22 75 to 23 50 |
| So. Fdy. No. 2 soft | | 19 75 to 20 75 | | | |

FINISHED MATERIAL.—There is nothing about the market for finished material to distinguish from the conditions that existed last week. Bar iron and steel bars sold well during the week. Sheets, plates, angles and other shapes have been in good demand, with early delivery urged; and contracts have been freely placed for structural material for delivery many months hence according to the ability of the producers to furnish it. There have been some sales of rails for traction lines, and at least three companies have ordered rails for delivery as early in the new year as possible. Bar iron remains at 1.92c and steel bars at 1.72c, both being quoted at 2.20c out of store. Angles are 2.35c and 2.50c out of store. Sheets are quoted at 2.50c for No. 12 and 2.35c for No. 10.

OLD MATERIAL.—Scrap iron is quiet. The demand is not so very active and the supply is not very great. Prices remain unchanged and indications are that while the market is not very full of material there is plenty to meet the very ordinary demand that exists. Prices at Cincinnati are as follows:

| | |
|---|---|
| Old No 1. Wrought Railroad, net tons | $ 20 50 to 21 00 |
| Cast Machine and Foundry, net tons | 14 50 to 15 00 |
| Old Iron Rails, gross tons | 25 00 |
| Old Steel Rails, gross tons | 24 00 |
| Old Short Lengths, gross tons | 17 50 to 18 00 |
| Old Iron Axles, gross tons | 26 75 to 27 00 |
| Old Iron Car Wheels, gross tons | 19 50 to 20 00 |
| Stove Plates, gross tons | 11 00 to 1 25 |
| Wrought Turnings, net tons | 14 50 to 15 00 |
| Cast Borings, net tons | 9 50 to 9 75 |

## PHILADELPHIA.

July 22.

The strike of coal miners still dominates the situation, and until that has been settled it will be impossible to say what course the market will take. It is difficult to see any reason for lower prices for iron. The fact that a number of concerns which have been buyers of steel are putting in their own open-hearth plants will relieve the steel situation in time.

PIG IRON.—The scarcity of iron shows no abatement, and shipments for this year command almost any price that holders ask. Such prices give little idea, however, of the market, as they depend almost entirely on the relations which exist between buyer and seller. It is a favor to get iron for August. From $23 to $25 is being paid for early delivery for No. 2 foundry. Prices for 1903 are about as follows: No. 1 X foundry, $23.50 to $24.50; No. 2 X foundry, $22 to $22.50; No. 2 plain, $21.50 to $22; standard grey forge, $22.50 to $21.50; basic, $20.50 to $21. For prompt delivery: Low phosphorus, $23 to $23.50; No. 3 Middleboro, $21 to $22; Scotch irons, $22.50 to $23.50.

BILLETS.—Offerings for prompt delivery are very light. For the last quarter of the year $32 to $33 could be done for American and $29.50 to $30 for foreign, but no sales have been reported within the past few days.

FINISHED MATERIAL.—There is a heavy demand for plates, and mills are receiving application for quantities much greater than they can supply, but bars and sheets are rather quiet, the latter being somewhat lower on large orders. Prices remain about the same as last week, viz.: Plates, small lots, 2.10c to 2.15c; carload lots and upward, ¼-inch and thicker, 2c to 2.05c; universals, 2c to 2.05c; flange, 2.10c to 2.20c; firebox, 2.25c to 2.30c; marine, 2.30c to 2.35c. Soft steel bars are held at 2c to 2.15c; refined iron, 1.95c to 2c for city or nearby deliveries. Structural material, beams, angles, etc., 2.35c to 2.75c for foreign from store or on ship; mill shipments, 2.75c to 3c f. o. b. sellers' mills for reasonably prompt delivery.

OLD MATERIAL.—The demand is improving and sales are now pretty close to the full asking price. Quotations are as follows: Old steel rails, $21 to $21.50; heavy steel scrap, $21 to $21.50; low phosphorus scrap, $27.50 to $28.25; old steel axles, $27.50 to $28.50; old iron axles, $29 to $30; old iron rails, $25 to $26; old car wheels, $20.50 to $21.50; choice scrap railroad No. 1 wrought, $23 to $24; country scrap, $18.75 to $19.75; machinery cast, $18.50 to $19; No. 2 light scrap (forge), $18 to $19; No. 2 light scrap (ordinary), $15.50 to $16.50; wrought turnings, $16.50 to $18; cast borings, $10.50 to $11; stove plate, $13.75 to $14.50.

## NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., July 22.

PIG IRON.—Several large Southern producers of pig iron opened their books for 1903 in the past week, with results thus far above expectations, both as regards sales and number of inquiries and the sales which have been made. In two days the sales made by one producer alone equalled about one-third of all the iron it can turn out for the first six months of next year. The aggregate tonnage represented by the transactions is estimated at about 70,000 tons. Most of the sales have been for No. 2 foundry, and on the basis of $17 Birmingham. There is still considerable tonnage to be had at $17, but delivery cannot be promised with any degree of certainty before April. Conservative establishments have placed their orders in the belief that present and prospective conditions justify them in doing so. So far as can be learned the large Southern producers will not have any iron for sale for fall delivery. This will come as a disappointment to many who had taken assurances to the contrary as fact. Since the announcement a few weeks ago that several Southern producers expected to have among them 30,000 tons for shipment this year the miners' strike has upset all calculations. As bearing on the foreign pig iron situation, a well known New York house recently made extensive inquiries as to the probable quantity of Scotch brands that can be had for shipment this year, and learned that at the highest it could be placed at 75,000 tons. The demand for iron for delivery during this and next month has been especially keen during the past week, and good premiums are paid for whatever can be had. Foundrymen who have iron on hand are averse to reselling, despite the big profits the premiums would represent. Pending the labor troubles in the anthracite region, the market for

Pennsylvania iron is dead. Two-thirds of the anthracite furnaces are said to be banked, and those in operation are not running to their full capacity. New York prices for summer delivery continue nominal and are as follows: No. 1 X, $23.50 to $25; No. 2 X, $22.75 to $23.50; No. 2 plain, $22.25 to $22.50; No. 1 foundry Southern, $22 to $23; No. 2 foundry Southern, $21.75 to $22.50; No. 3 foundry Southern, $21.25 to $22.75; No. 4 foundry Southern, $20.75 to $21.25.

FINISHED IRON AND STEEL.—There were no new developments of note during the past week. Conditions in structural material are still such as to make spot sales extremely remunerative For some time past building operations in and around New York, especially of an extensive character, and particularly in "sky-scrapers," have been in the hands of a certain large company. During the week another company was incorporated, and the trade interprets the entrance of the new company into the field as promising well for large building operations in the near future. Sheared plates continue to be eagerly sought for use in ship and bridge building centers, and prices for immediate delivery are higher. In sheets conclusive proof was furnished during the week that independent mills are selling at lower prices in view of the dullness which prevails. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.95c; zees, 1.75c to 1.95c; bulb angles, 2.05c to 2.25c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; firebox, 2.30c to 3.50c. Refined bars, 1.95c to 2c; soft steel bars, 1.95c to 2.05c. Sheet steel, in carloads, New York, No. 28 black, 3.18c to 3.25c; No. 28, galvanized, 70 and 10 off.

## ADVANCES IN MACHINE TOOLS.

The action of the builders of lathes and radial drills a few weeks ago in advancing prices about 10 percent has been followed by a decision of manufacturers of drill presses, planers and shapers to advance prices 5 to 10 percent. A meeting was held at the International Hotel, Niagara Falls, July 15, at which J. B. Doan, of the American Tool Works Co., presided and P. E. Montanus, of the Springfield Machine Tool Co., Springfield, O., acted as secretary. The following firms were represented:

Hoefer Mfg. Co., Freeport, Ill.; Ohio Machine Tool Co., Kent, O.; Springfield Machine Tool Co., Springfield, O.; Sibley & Ware, South Bend, Ind.; Flather Planer Co., Nashua, N. H.; the Wilson Machine Co., and the W. P. Davis Machine Co., of Rochester, N. Y.; H. G. Barr, the Blaisdell Co., Prentice Bros. Co., J. E. Snyder, Woodward & Powell Co., and the Whitcomb Mfg. Co., of Worcester, Mass.; the B. F. Barnes Co., Rockford, Ill.; Gould & Eberhardt, Newark, N. J.; Aurora Tool Works, Aurora, Ill.; the American Tool Works Co., Cincinnati Planer Co., Cincinnati Machine Tool Co., and the Cincinnati Shaper Co., of Cincinnati.

The advance in planers and drill presses is effective at once. That on shapers is expected to take effect about Aug. 1, a further meeting at that time being likely.

The firms in attendance at the Niagara Falls meeting allied themselves with the recently formed National Machine Tool Builders' Association. The reasons leading to the advance noted as above are those that actuated the lathe manufacturers who met at New York on June 12. The situation was thoroughly discussed at these various meetings and the action taken was considered justifiable and fair to all concerned in view of the constant advance in raw material and the higher cost of labor.

The National Machine Tool Builders' Association has now a membership of about 40 of the prominent machine tool manufacturers of the country. The next meeting will be held some time in October, and will be the annual convention. The constitution says that "the objects of this association are to promote the interests of the machine tool builders in the direction of good fellowship, and the liberal discussion of subjects pertaining to the manufacture and sale of machine tools." The association, the constitution provides, "shall make at its annual conventions such laws, define such policy, adopt such resolutions and render such decisions as shall further the interests of the association, and the acts, resolutions and decisions of a national convention shall be final and binding upon all members." Special conventions may be called by the president at the written request of eight members of the association.

The officers are the following: President, F. E. Reed, Worcester, Mass.; 1st vice president, Wm. Lodge, Cincinnati; 2d vice president, W. P. Davis, Rochester, N. Y.; secretary, P. E. Montanus, Springfield, O.; treasurer, Enoch Eagle, Worcester, Mass.

## AMERICAN BOILER MANUFACTURERS' ASSOCIATION.

(Special Telegram.)

ATLANTIC CITY, N. J., July 23.—The fourteenth annual convention of the American Boiler Manufacturers' Association opened at the Royal Palace Hotel at 10 o'clock Monday morning. At the opening session the convention was addressed by Hon. Franklin P. Stoy, mayor of Atlantic City, who welcomed the guests in a very cordial manner. Richard Hammond, president of the association, replied to the address by the mayor and speeches were also made by Henry J. Hartley, of Philadelphia, and Col. E. D. Meier, of New York. A business session occupied part of the time in the afternoon and meantime the wives and friends of the delegates were entertained by the local committee, who gave them a carriage ride to all points of intrest in the city. In the evening a cake walk and hop were arranged for in the Casino and the rival teams of Youngs Pier and The Steel Pier contended for a number of elaborate prizes.

Topical discussions occupied both sessions Tuesday together with election of officers for the ensuing year. The following officers were elected: President, John O'Brien, St. Louis; secretary, J. D. Farasey, Cleveland; treasurer, Joseph Wangler, St. Louis; first vice president, Robert Monroe, Jr., Pittsburg; second vice president, Samuel Borger, Columbus; third vice president, J. M. Robinson, Boston; fourth vice president, M. F. Cole, Newman, Ga.; fifth vice president, J. F. Casey, Chattanooga, Tenn.

The next annual convention will be held at Chattanooga, in order to give the Southern contingent an opportunity of showing their well earned reputation for hospitality. The date of next meeting will be decided upon by the local committee, and all members and others interested will be duly notified. Thirty-six of the 85 members of the association are represented as follows:

R. H. Bate, Wm. T. Bate & Son, Conshohocken, Pa.
George R. Lombard, Lombard Iron Works, Augusta, Ga.
W. H. McAleenan, McAleenan Boiler Works, Peoria, Ill.
J. Don Smith, Volk & Murdock Iron Works, Charleston, S. C.
Henry J. Hartley, Wm. Cramp & Sons, Philadelphia, Pa.
G. Weidner, Walsh & Weidner Boiler Co., Chattanooga, Tenn.
Jas. Lappan, Jas. Lappan Mfg. Co., Pittsburg, Pa.
J. D. Farasey, Teachout Boiler Works, Cleveland, O.
T. M. Reese, James Reese & Sons Co., Pittsburg, Pa.
John O'Brien, John O'Brien Boiler Works, St. Louis, Mo.
Richard Hammond, Lake Erie Boiler Works, Buffalo, N. Y.
John McAdams, McAdams Boiler Works, Philadelphia, Pa.
Col. E. D. Meier, Heine Safety Boiler Co., New York City.
Jos. F. Wangler, Boiler & Sheet Iron Works, St. Louis, Mo.
Hugh Tudor and Chas. T. Tudor, Tudor Boiler Works, Cincinnati, O.
A. H. Kemper, the Brownell Co., Dayton, O.
J. B. Campbell and Carlton Riddle, McNiel Boiler Works, Akron, O.
J. J. Fox, Marietta Boiler Works, Marietta, Ohio.
Jas. F. Morrison, Pittsburg, Pa.
John Mohr, J. Mohr & Son, Chicago, Ill.
J. Thompson, J. Thompson Iron Works, Philadelphia, Pa.
E. J. Codd, E. J. Codd Co., Baltimore, Md.
R. Munroe, Jr., R. Munroe & Son, Pittsburg, Pa.
Wm. Radcliffe, Radcliffe, Smith & Co., Philadelphia, Pa.
Thos. McNiel, McNiel Bros., Pittsburg, Pa.
S. Borger, Borger Bros. Co., Columbus, Ohio.
T. P. Robinson, Atlantic Works, Boston, Mass.
John Rourke, Savannah, Ga.
Wm. A. Brunner, Tippet & Woods, Philadelphia, Pa.
M. Burnet Easton, International Boiler Works Co., East Stroudsburg, Pa.
J. J. Heine, Heine Safety Boiler Co., Toronto, Can.
John B. Scheibly, McIlvain & Spiegel Boiler & Tank Co., Cincinnati, O.
Chas. Freeman, S. Freeman's Sons' Co., Racine, Wis.
Frank Chrysler, Franklin Boiler Works, Troy, N. Y.
H. S. Vanzile, Franklin Boiler Works, Troy, N. Y.
F. D. Morrison, Gem City Boiler Works, Dayton, O.
Henry Goldner, H. Goldner & Son, Philadelphia.

A very good program, including tickets of admission to all entertainments and convention, has been arranged by the local committee. The convention will close Wednesday night with an elaborate banquet.

# THE IRON TRADE REVIEW

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## IRON AND STEEL PRICES AND THE OUTLOOK.

With the middle point of the year passed, and the crop situation gauged with a much better approach to the actual than has been possible in any preceding month, many consumers of iron and steel are now freely committing themselves for the first half of 1903. On the face of things, it might be considered that the prices now asked would cause much hesitation. This more particularly applies to pig iron and to billets than to finished forms. Buyers of foundry iron, for example, who one year ago were paying $10 to $10.50 for No. 2 Southern iron at the furnace, and $13.25 to $13.50 for No. 2 Northern, some of them being still in receipt of iron bought on substantially this basis, might well be staggered at the prospect of paying for 1903 delivery $17 at furnace for Southern iron and $21 for Northern iron, or an advance of 60 percent. Such buyers get a very impressive illustration of the changed conditions, when after contracting in some cases in the latter part of 1901 for their supply of iron for the entire year 1902 at, say, $14 to $14.50 for Northern No. 2, they are now asked $23, $24 and even $25 for prompt iron, when in need of more than their contract engagements bring them. It is certainly a matter to be carefully considered, whether such an advance as foundry iron has had in the past year will not suggest to a good many consumers that at the prices they must ask for their products the public will not buy as freely as before.

Yet the past two weeks have shown a heavy volume of business in foundry irons, and the furnaces have now sold from one-third to one-half their expected output for the first six months of 1903. The significant fact here is that while in the boom of 1899, with its hurtful reaction, foundry iron went to $24, the average cost of the foundry iron that went into castings in that year was several dollars a ton less than foundrymen are now paying for their iron for 1903. This does not mean that a reactionary movement is close at hand, for there are no signs of such a tendency in current developments, but it does suggest that in many lines the consumer must pay considerably higher prices next year, and if he pays more he will buy less.

But when the prospects of any lower prices for foundry iron in the first half of 1903 are canvassed the chance that supply will exceed demand in that period does not seem large. That the foundry iron producing capacity of the country has been inadequate all this year is evident from the pig iron statistics. It is entirely improbable that any part of the furnace capacity now producing steel-making pig iron will be diverted to foundry iron, for the steel shortage is really a pig iron and scrap shortage. The South is sending less foundry iron to the North than at any time in several years, and there is an actual and permanent shortage here due to the demands of Southern steel works, that Northern producers must provide for. The six furnaces now under way at Buffalo, Cleveland, Toledo, Detroit, and South Chicago, are all to make foundry iron. All the builders of these furnaces have had large experience in the iron trade. That all these several companies, on independent investigation, should have decided in this year of high costs, to embark upon their respective enterprises is significant of a condition of which buyers of foundry pig iron in recent weeks have been made painfully aware.

The steel situation which has been marked for months by an abnormal "spread" between pig iron and billets, promises no early relief to the independent mill having no steel plant. Billets are now $8 to $9 a ton higher than at this time last year. Meanwhile finished material has had only a moderate advance. In the case of sheets prices are $3 to $5 a ton lower than those of one year ago. Plates and shapes are nominally and officially on the same basis as in July, 1901, but really from $4 to $6 higher. Bar iron is $7 higher and steel bars about $4 higher. In rolled material, therefore, the market has not worked up to such a point as to bring serious question to those entering upon new undertakings. Railroads, with the cumulative increases in earnings of five successive years (apart from the recent decreases on corn roads as compared with last year) are still buyers on a scale almost magnificent. But the individual buyer of stoves, or agricultural machinery or shelf hardware may make a protest in the coming twelve months that will be felt. In general, the saving of the rolled material market from excessive advances, and the gradual bringing in of the new steel and finishing plants now under way, should keep the market, when the turn does come, from such a sudden and serious unsettling as followed the boom of 1899.

## UNTAKEN FIELDS OF INVENTION.

One of our correspondents described in the July Machinery Issue of *The Iron Trade Review*, and found some humor in a recently patented invention which consisted of a rigging for holding in place before the reader an open book. The utility of an invention is of little or no consequence from a purely legal point of view, as compared with the novelty of the arrangement, and this in itself fully explains many of the devices which make their mark upon the records of the Patent Office. The very small minority which comes to any

useful purpose in the practical world does not deter the army of applicants besieging the Government for letters patent, and the constant struggle between examiner and patent attorney is at least profitable in fees, even if the total grist of the mill largely ends in husks.

The readiness to invent anything from a flying machine to a none-refillable bottle is not more surprising than the failure to take advantage of the opportunities to utilize thoroughly inventions already in service. There is often an indifference to the awkwardness of some familiar devices that can only be explained on the assumption that familiarity with the conditions has bred a contempt for minor defects and in constant handling these have ceased to annoy the user. A lead pencil, for example, is as familiar and useful an instrument as may be found in shop or office. Either in drafting room or accounting department it is the constant companion of every member of the force. There is a minimum of parts in its construction and possibly it could not be simpler, but the wearing away of the marking material and the consequent paring of the wooden sheath are necessary nuisances endured by all. Inventions have been made to mitigate them but the old form survives and from all appearances a change is unlikely.

In the machine shop some benefit would be derived by having a uniform standard for diameters and threads on lathe and other spindles. Chucks, faceplates, etc., would then interchange with facility. There is little doubt that this would be more difficult to establish generally than the making of a uniform taper for the lathe centers. The advantage, however, would be worth the effort in many cases.

The use of section lined paper for sketching, graphic representation of proportionate quantities, fluctuations in prices, computing the results of two or more factors, etc., is known more or less and the value of the slide rule, the omnimeter and other mechanical contrivances in working out calculations, estimates, etc., is fairly well recognized but little followed in proportion to the field offered for such usefulness.

The modern telephone, that indispensable adjunct to every business office, presents another instance of like character. It would really seem but a trifling matter for one of the many ingenious gentlemen whose efforts weekly adorn the pages of the Patent Office *Gazette* to invent a means of holding the receiver of this useful instrument. Probably the task of invention is not so much the trouble as the struggle with the subsequent adoption of the device by the operating companies. Public convenience would be served by making the instrument less dependent upon human support and a mechanical appliance for this purpose will be a pressing necessity with the future development of the business. At any rate it would seem to be entirely opposed to the spirit of the time that one of the hands of each of the two users of the device should be constantly needed to maintain the connection. It is true that the companies use in their exchanges a purely mechanical means of preserving the connection of the operator but such a device would be very crude if applied to transient service. Few of the users of the telephone have need for long periods of work with the instrument, though the calls may be frequent, and anything in the nature of a harness is too permanent in service and too awkward a solution of the difficulty.

Many other instances might be cited, as smoke prevention and the continued work of designers upon light-weight motor vehicles for pleasure purposes as compared with the immense field for transportation of freight by such methods—a field in which humane as well as engineering and commercial considerations suggest immediate need of attention. These improvements remain in abeyance not so much because of any difficulty beyond the possibility of solution by modern skill and invention, but the indifference of those most to be benefited. The inertia of the mind is responsible in a large measure for many of the deficiences in our civilization and it is only by an occasional exercise of the critical, though not the carping, spirit that the progressive element can hope to bring the lagging forces to their proper place in the ranks.

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Of the $564,750 raised by the Iron Molders' Union of North America for all purposes in the past three years, the reports of its officers show that $310,000 was expended for strike benefits. This must be multiplied several times to arrive at a figure representing the losses the molders have incurred in their strikes since June, 1899. Yet the tendency in this union seems rather toward more than fewer strikes. Even the arbitrament of its own National officers has been rejected in many cases. Such a record does not look hopeful for any early practical acceptance by the Iron Molders' Union of the principle of arbitration, though its officers strongly urge it. Small wonder that President Fox in his report to the Toronto convention insists that there could be no safety except in retaining the rule that all strikes must be sanctioned by a central authority. He adds significantly: "The present law does not satisfy those who would 'rule or ruin,' nor those who have not yet learned the virtue of self-restraint, but I say without fear of successful contradiction that more disaster, more utter ruin has come upon labor organizations by hasty strikes than from any other cause."

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### Jones & Laughlins Reorganization.

(Special Telegram.)

PITTSBURG, July 23.—A meeting of the board of directors of Jones & Laughlins, Ltd., is being held today for the purpose of reorganizing into a stock company from the present limited partnership. The present capitalization, which is $20,000,000, will be more than doubled, but there will be no change in the ownership, the stock to be taken by the present holders. Officers will also be selected but it is not probable that there will be many changes in the organization. The present officers are: B. F. Jones, Jr., chairman; Willis L. King, vice chairman; Irwin B. Laughlin, treasurer; William C. Moreland, secretary; William Larimer Jones, general manager, and Thomas K. Laughlin, assistant treasurer. The company recently completed the erection of a Talbot open-hearth furnace with a daily capacity of 400 tons and two acid open-hearth furnaces with a daily output of 100 tons. A blooming mill is under course of erection at its South Side plant which will be in operation about the first of the year. Finishing capacity will also be installed to take the steel from this mill. The company is the largest independent producer of steel in the United States.

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### Pittsburg Steel Co.

(Special Telegram.)

PITTSBURG, Pa., July 23.—The Pittsburg Steel Co., of this city, has placed its plant at Monessen, Pa., in partial operation during the week. The nail, barb and fence wire and galvanizing departments are on in full and the rod mill with a daily capacity of 600 tons will be placed in operation in about four days. The wire drawing department will also be placed in operation shortly. The wire nail department contains 175 machines with an annual output of 1,250,000 kegs. The galvanizing department has an annual capacity of 45,000 tons and the field and barb wire departments will have an annual output of 27,000 tons. No decision has yet been reached concerning the erection of an open-hearth plant and blooming mill.

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The Sharon Steel Co., Sharon, Pa., has purchased 51 farms having a total of 4,000 acres in Lawrence county, Pa., having valuable coal and limestone deposits. The company has been quietly taking up leases for six months. The territory will be developed. A railroad line to connect with the plant at Sharon will be built and branches will be laid to all parts of the field as rapidly as necessary. The supply of coal and limestone will, it is believed, last the company many years.

## A FEEDING MECHANISM FOR SHEET MILLS.

A patent has been allowed to Fritz Oscar Stromberg, formerly of Braddock, Pa., but now a resident of Cleveland, for improvements in machinery for rolling sheet metal. The purpose of the inventor is to dispense with the hand labor which is commonly employed in feeding the rolls and to substitute mechanism which will feed a sheet or pack and pass it continuously through and back over the rolls. The machinery is so devised that the same end of the sheet or pack will be entered into the rolls but is also provided with means to reverse the sheet metal endwise when this may be desired.

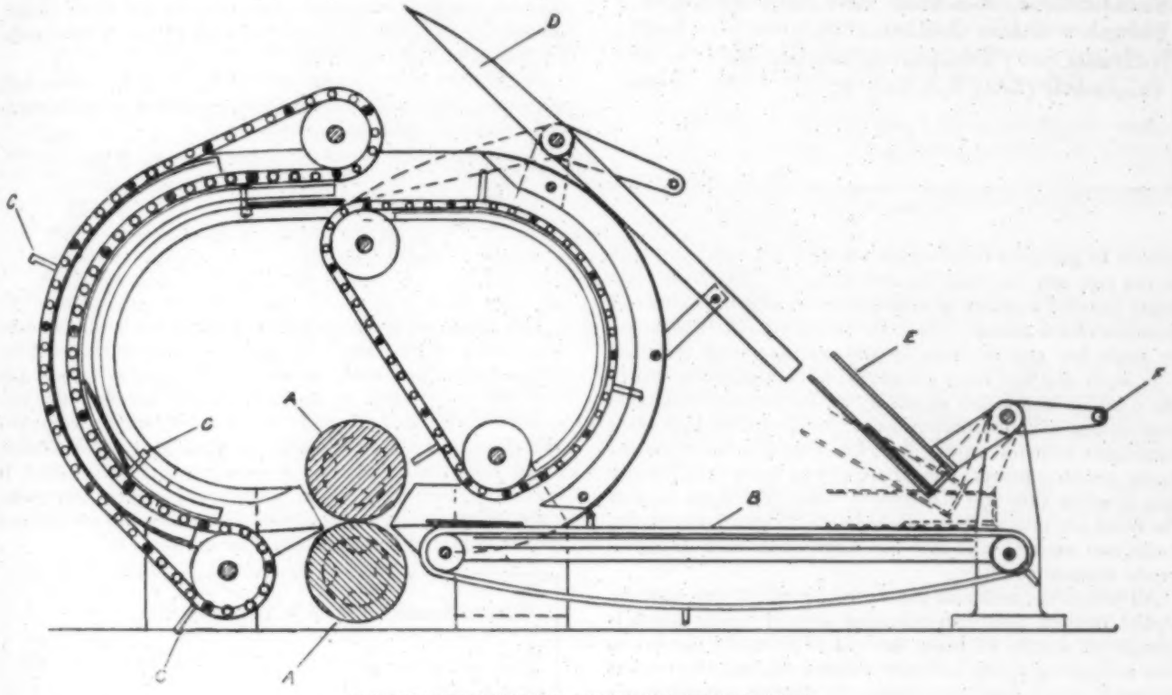
According to the usual method of rolling sheets the sheet bar is broken down in roughing rolls and a number of these roughed down sheets are then piled and given several passes in the hot rolls until they are reduced to such a gauge that a further reduction in thickness is impracticable on account of the spring of the rolls. The piles are then folded, reheated if necessary, and given further passes through the hot rolls and if then they are not brought to the required thickness they are again folded and rolled as before. In all these stages of rolling, whether roughing down or rolling in packs in the hot rolls, the sheet or pack is entered into the rolls at the front by one workman and is received at the rear of the roll by the catcher who returns the same over the rolls to the other; the sheet being thus passed through the rolls and returned until reduced to gauge or until further folding or reheating becomes necessary. This method of feeding the metal into the rolls is not only slow so that frequent reheating is essential but it is also expensive by reason of the skilled labor which is required.

The invention under consideration, comprises a conveyor extending from the rear of the rolls around to the front, the conveyor having the ends near to the pass of the rolls. The illustration shows a preferred form of the inventor's apparatus; the sheet rolls being represented in side elevation at A. The machinery for receiving the sheet from the rolls and returning them to the front of the machine comprises a conveyor which as shown curves upward and over the rolls and thence down to the front. The conveyor is formed of side plates made of channels united by stay rods and supported by suitable brackets. There are practically two sections of the conveyor, these two sections being of the same construction except that one is reversed to the position of the other.

The metal in the form of a bar, pack or sheet, is fed to the rolls in any convenient manner, as for instance by means of the feed table B whose inner end lies beneath the front end of the conveyor. The metal enters the rolls A and passes through to the conveyor where it is seized by the prongs on the chains C and carried over to the forward half of the conveyor which in turn presents the sheet to the rolls. This process is repeated until the sheets have been reduced to the proper gauge for rolling two at a time or have cooled sufficiently to need reheating.

The mechanism thus far described will always introduce the same end of the sheet or pack into the rolls. On account of the spring of the rolls the sheets will be reduced more at their edges than at their middle; this causing a backward flow of the metal along the edges of the sheets which results in a fish tail shape to one end of the sheet while the front end will be rounded. Whenever this takes place it is desirable to turn the sheets endwise in order to counteract this effect and cause the metal in the edges of the sheet to flow in the opposite drection.

A rocking frame D is employed for reversing the sheets endwise as well as taking them out of the conveyor when finished, or for reheating, folding or piling. This frame D is composed of a rock shaft mounted in bearings and provided with a lever or handle. At one end of the frame are a number of tapering fingers or bars; and by rocking the shaft and frame to the position shown in dotted lines, the ends of the fingers are brought below the path of the sheets and they are pushed upward along the fingers onto the frame. The skeleton frame is then moved to the position shown in the full lines and the sheet slides down the frame D to the forks seen at E. The forks E may be operated with an arm or hand lever or have a counterweight at F which will hold the forks in an upward position until receiving the sheet when the weight of the latter will overcome the counterweight and the forks will swing to the lower position and the sheet will be caught by the conveyor at the feed table B and returned to the sheet rolls. In this manner a sheet may be reversed endwise whenever required.




THE STROMBERG FEEDING DEVICE FOR ROLLING MILLS.

When the sheet has been reduced to the required gauge or to such a thickness that it must be folded, the skeleton frame D is rocked to the position shown by the dotted line to extract the sheet from the conveyor and the forks E are turned down sufficiently, as at the intermediate position indicated by the dotted lines, to cause the sheet as it slides down from the frame D to strike on the outer or upper side of the forks and slide out onto the floor.

The inventor shows other modifications of the conveyor and describes two sets of positively driven rolls to take the place of the sprocked chains and guide bars C. These rolls are formed as a series of discs, spaced and staggered, in order to have as little chilling effect on the metal as possible.

## A TECHNICAL INDEX AND FILE.*

BY R. H. SOULE, NEW YORK.

This system is a new combination of old elements, the card index and file boxes; in developing it the aim has been to secure compactness with facility for quick and ready reference, and to avoid the use of scissors and paste pot. The index card chosen as being most convenient is a medium heavy white card, approximately 3 inches by 5 inches (actually 7½x 12½ centimeters), ruled with horizontal blue lines, and punched near the lower edge; in the Library Bureau catalogue this is classified as their 33 *r* white card.

The file boxes are of three different sizes, the inside dimensions being as follows: small size, 7 inches by 10 inches by 3 inches; medium size, 9½ inches by 12¾ inches by 3 inches; large size, 11½ inches by 16½ inches by 3 inches. They are all

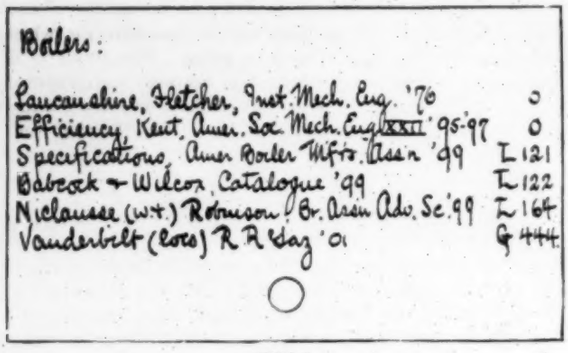

Boilers:
Lancashire, Fletcher, Inst. Mech. Eng. '76 O
Efficiency, Kent. Amer. Soc. Mech. Engineers '95-97 O
Specifications, Amer Boiler Mfrs. Assn '99 L 121
Babcock & Wilcox Catalogue '99 L 122
Niclausse (w.t.) Robinson Br. Assn Adv. Sc. '99 L 164
Vanderbilt (Locos) R.R. Gaz '01 G 444

FIG. 1.

similar to pamphlet cases in general make up, and open both at one side and one edge, the two hinged covers of each box being fastened together by a simple catch, which is opened by pressure of the thumb. These file boxes are not to be found in stock, but can be made by any manufacturing stationer. The small size box takes pamphlets, trade catalogues, etc., of the 6 inches by 9 inches standard; the medium size box takes publications of approximately letter size, including both trade catalogues, technical papers, etc.; the large size box takes the larger technical papers; blue prints may be taken in either size box to which they will conveniently fold. The three sizes of file boxes are arbitrarily designated as P, L, and G (pamphlet, letter, and gazette), and each box bears on its back its appropriate designating letter.

All pamphlets, technical papers, etc., received, are carefully looked through, and each contained item or article which is considered worthy of being indexed is checked; the covers and advertising sheets are then stripped off, and the reading matter is cut up into single sheets, by running a paper cutter through the binding edge; those sheets which do not bear a check mark on either side are taken out and discarded; those sheets which do bear one or more check marks on either side are then bound together by metallic binders, after which the proper file number is placed in the upper right hand corner.

Each size of file box has its own series of file numbers running from 1 up, and each enclosure prepared for filing (as above described) is marked with both its proper file letter and number, the first of each series being marked P1, L1, and G1; each subsequent enclosure bears the next consecutive file number to the last one previously used in its series. In assigning the enclosures to the file boxes size alone determines; no classification by subject is attempted, that being taken care of by the card index; no vacant numbers or spaces are left, and each series is filled up solid.

After the file enclosures are prepared and given their file numbers, the checked items and articles are indexed, by making the proper entries, by subject, on the index cards. The general subject is entered at the top of the card, nothing else being put on that line; six additional lines (seven in an extreme case) are available below, and these are used for consecutive references to the general subject, after which additional cards are used. The index references to enclosures in the file give the name of the technical paper, in abbreviated form, and the year of publication; it has been found to be unnecessary to give the month and day, they can be ascertained by reference to the file itself, if needed. The index also contains references to sources of information outside of the file; these are obtained by going through the files of technical papers not subscribed to, the transactions of technical societies of which the writer is not a member, and certain other technical literature, all of which may be found in the library of the American Society of Mechanical Engineers. In making the index entries of these references, it is necessary to be specific as to the source of information, the volume, page, date, etc.; instead of the file number, which in ordinary file references appears in the right hand margin of the card, a zero is used, indicating that the reference cannot be found in the file, but must be sought in an outside source of information. Similarly, a few references to books in the writer's library are given; this is done only when a book contains some valuable information which is not covered by its title, as for instance, "Tools, power required to drive" (see Flather's "Dynamometers"). In this case, although the book is on the subject of Dynamometers, an entire chapter of 73 pages is devoted to the subject of the power required to drive machines, and contains tabulated statements of great scope and value. Typical index cards, illustrating the different classes of references, are shown in Figs. 1, 2 and 3.

The writer's index and file were begun about two and a half years ago. During this period the accumulation of index cards and references has been as follows:

| No. of Index Cards. | No. of References on each Card. | Total No. of References. |
|---|---|---|
| 105 | 1 | 105 |
| 68 | 2 | 136 |
| 34 | 3 | 102 |
| 26 | 4 | 104 |
| 22 | 5 | 110 |
| 419 | 6 | 2514 |
| 12 | 7 | 84 |
| 686 | | 3155 |

This shows an average of 4.6 references per card, and substantiates (for the index) the claims of compactness and facility of quick and ready reference; the more references per card the fewer cards to be provided and handled, the less space occupied, and the more cards and references consulted in a given time. Six references are considered as constituting a full card, but occasionally a seventh reference is added, if it closely relates to the sixth. Of the total of 3,155 references, 2,269, or 72 percent, are to enclosures contained in the file, and 886, or 28 percent, are to outside sources.

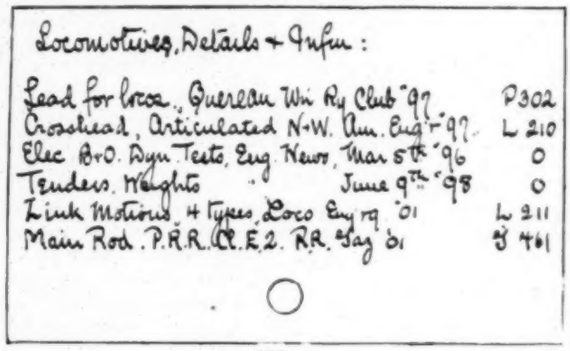

Locomotives, Details & Furn:
Lead for locos., Bureau Wi Ry Club '97 P302
Crosshead, Articulated N.W. Am. Eng. '97 L 210
Elec Bro. Dyn. Tests, Eng. News, Mar 5th '96 O
Tenders, Weights June 9th '98 O
Link Motions, 4 Types, Loco Eng rq '01 L 211
Main Rod. P.R.R. C.E.2. R.R. Gaz '01 G 461

FIG. 2.

The accumulation of references under individual subjects will, of course, be influenced largely by the particular field in which the person developing the index and file is working; the writer's specialty being railway mechanical engineering, the number of references accumulated under 15 principal subjects (out of a total of 271 subjects) has been as follows:

| | |
|---|---|
| Boilers | 125 |
| Brakes | 70 |
| Cars | 233 |
| Coal and coaling | 65 |
| Cranes | 43 |
| Electricity | 51 |
| Engines | 79 |
| Locomotive diagrams | 198 |
| Locomotive details and information | 314 |
| Power plants | 66 |
| Shop diagrams | 128 |

*Read at the Boston meeting (May, 1902) of the American Society of Mechanical Engineers.

| | |
|---|---|
| Shop notes and information | 55 |
| Tools | 43 |
| Train resistance | 38 |
| Trucks | 45 |

The index cards are kept in a four-drawer case of Library Bureau make. Buff bristol guides are inserted between the white cards to show the alphabetical subdivisions by first and second letters. The original outfit of file boxes (since duplicated) included 12 small size, or P boxes, 6 medium size, or L boxes, and 6 large size, or G boxes. These 24 file boxes are kept in a case, as shown by Fig. 4. Each file box is provided

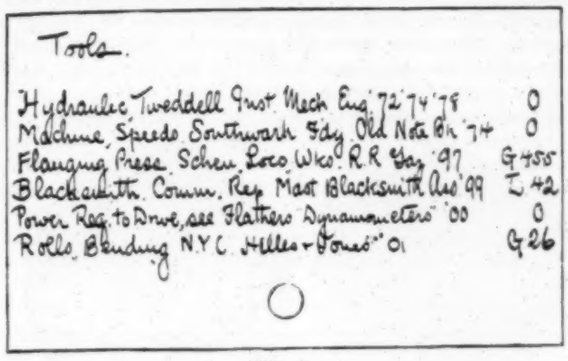

Tools.
Hydraulic Tweddell Inst. Mech. Eng. '72 '74 '78 O
Machine, Speeds Southwark Eng. Old Nota Bn '74 O
Flanging Presses Schen. Loco. Wks. R.R. Gaz. '97 G 455
Blacksmith. Comm. Rep. Mast Blacksmith Ass'n '99 L 42
Power Req. to Drive, see Flather's Dynamometers '00 O
Rolls, Bending N.Y.C. Hilles & Jones '01 G 26

FIG. 3.

with a leather pull tag, and when filled is marked with the file numbers of its first and last enclosures, thus: P 1—P 30.

It so happens that the amount of storage space originally provided in each size of file boxes (12 P boxes, 6 L boxes, and 6 G boxes) was about right, each series being now completely filled with enclosures, two additional boxes of the P size being also filled, however. As previously stated, a second set of file boxes with a file case like that shown in Fig. 4, has been provided and is now in use. In support of the claim that the file (as distinct from the index) is compact and affords fa-

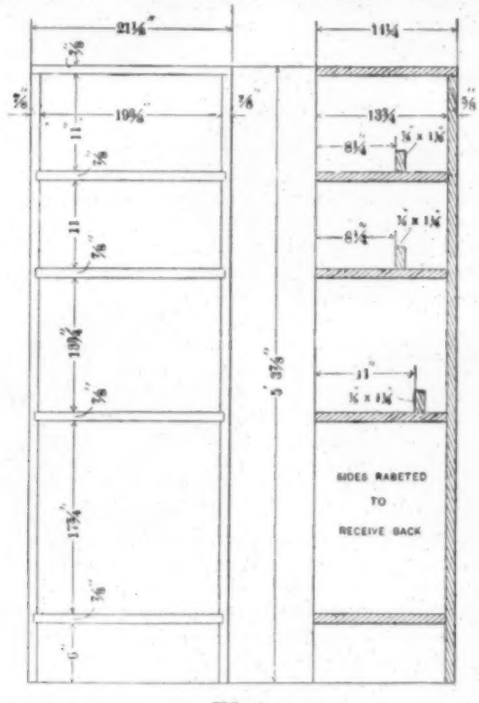



FIG. 4.

cility for quick and ready reference, it should be noted that it requires only about 11 cubic feet of space to store enclosures containing 2,269 references (the remaining 886 references, out of a total of 3,155, referring to sources of information outside the file). Moreover, any one of these reference enclosures can be located and withdrawn in a minimum of time.

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L. B. Foster and L. A. Green have organized the firm of Foster & Green with offices in the Hamilton Bldg., Pittsburg, for the purpose of dealing in iron, steel, metals and rails.

## INDUSTRIAL DEVELOPMENT AT PORT HURON, MICH.

A very successful method of adding to the industrial interests of a city has been followed by the Factory Land Co., of Port Huron, Mich., and to that enterprising company the city owes much of its prosperity and progress. What is known in Port Huron as "the parent company" is the Port Huron Engine & Thresher Co., with a capital of $800,000, which was organized in 1874 at Battle Creek, as the Upton Mfg. Co. It continued at Battle Creek until 1884. Then the citizens of Port Huron subscribed for $100,000 worth of the stock of the company, whose plant was moved to their city and the name changed to that of today. After their experience in getting a large manufacturing establishment, Port Huron citizens organized the Factory Land Co. and went to work in earnest to establish other industries. Land was purchased and offered on easy payments to workingmen. The result was that the southern portion of the city has been converted into a hive of industry. Homes have been built, shops erected, and streets paved. The following companies have been organized:

Port Huron Mfg. Co., capital and surplus, $130,000, which manufactures sawing machinery, threshing machines, feeders, etc., and employs about 150 men.

Port Huron Malleable Co., Ltd., capital $60,000, makes malleable castings of all kinds; starts with 75 men.

Marshall & Crosby Co., capital $40,000, manufactures special order cabinet work, also plumbers' woodwork, now employs 40 men.

Port Huron Air Tool Co., Ltd., capital $60,000; makes compressed air hoists, motors, drills, hammers, air riveters, etc., employs 40 men.

Vine & Root Machinery Co., capital $10,000, makes lifters and windrowers.

Hardy Motor Works, Ltd., capital $30,000, makes gas engines, employing 25 men.

Port Huron Steel & Screw Co., Ltd., capital $100,000, manufactures steel shafting and set and cap screws; employs 100 men.

Another company which will be organized is the Port Huron Saw Co., Ltd., which will manufacture circular saws, machine knives, etc. E. W. Wilson, of the American Saw & Knife Co., Chicago, will be secretary and superintendent of the concern.

One of the best features of the plan of the Factory Land Co. is that it encourages workmen to save their money and invest it in homes.

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The directors of the United States Shipbuilding Co. have voted favorably upon the proposition to increase the capital stock to $45,000,000. It was at first proposed to capitalize the company at $20,000,000, but the acquisition of the Bethlehem Steel Co., the majority of the stock of which was owned by Charles M. Schwab and J. P. Morgan & Co., necessitated an increase.

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Tata & Co., of No. 88 Wall St., whose senior partner, J. N. Tata, of Bombay, is principally interested in the development of the mineral resources of the Chanda district, Central Province, India, will be in the market shortly for electrical equipment, which it is intended to utilize in water power plants for furnishing energy to work the Chanda properties. The contract to be let by Mr. Tata in this country will, it is believed, run above a million dollars.

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The annual outing of the employes of the Jeffrey Mfg. Co., of Columbus, O., is always a delightful event for both employes and employers, who unite in the pleasures of the day. This year's was the seventeenth, and was held July 12 at Idlewilde Park, Newark, O. The features of the day included a theatrical program free to all, numerous athletic events and other contests.

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The employes of the Kilbourne-Jacobs Mfg. Co., Columbus, O., were pleasantly surprised while attending a picnic last Saturday. Col. Kilbourne, president of the company, made a speech to the 2,750 people present and announced that at the next pay day the salary of every employe would be increased. The increase will be on a sliding scale from 4 percent to 15 percent, the lowest salaried workman to receive the greatest percent of increase. The total will advance the payroll $20,000 a year.

# Steel Rails: Relations Between Structure and Durability.*

BY ROBERT JOB.

An investigation was begun some time ago at the test department of the Philadelphia & Reading Railway, to determine qualities in steel rails which resulted in fractures or in relatively rapid wear in service, and to work out the means necessary to reduce these to a minimum. In order to gain information, arrangements were made to have forwarded to us a section of each rail which fractured in track or which was removed owing to undue rate of wear, together with detailed data regarding it. Such examination and tests as were necessary to establish clearly the cause of failure were then made. A considerable number of rails which gave good results in service have also been tested in the hope of finding fundamental characteristics which might account for the durability or the failure, as the case might be. Also, in our regular rail inspections at the mills, sections representing various methods of manufacture have been taken, and particular attention has been given to investigation of differences between rails which failed under the drop-test and those which passed it successfully.

Results of previous work upon rails had gradually forced the opinion expressed by Sir Lowthian Bell, that from the results of analysis of rails he could prove and disprove everything that could be said for or against any composition of a rail.

We believed then, as we do now, that proper chemical composition is one of the essentials in obtaining the greatest durability in steel rails, but our work had confirmed that of others, which will be referred to below, in proving that physical character and structure have at least an equal influence upon the final outcome. Accordingly, we have not limited ourselves to determining chemical composition, but have tried in each case to ascertain the definite cause of the weakness, whether chemical or physical.

Up to the present time about 200 defective rails have been examined. In some cases complete chemical analyses have been made; in others the loose, coarse-grained fracture or other physical character—such as piping—showed the cause at a glance, and in still others a rather elaborate investigation was necessary to prove the matter to a certainty.

It is evident, of course, that condition and arrangement of track has an important bearing upon durability of rails, and this matter, as we all know, has been worked out exhaustively by Mr. P. H. Dudley. Our experience, however, indicates that in the large majority of cases with normal track conditions, short life of rails is attributable to the character of the steel, and is seldom found where toughness, strength and solidity exist.

In a general way, the results of analysis in this investigation have merely confirmed the previous opinion, and have proved beyond question that specifying chemical composition alone ensures neither a durable rail nor often a bad rail. We found, however, from the start a marked difference in the structures, and note the following general characteristics in the rails which gave defective service: (*a*) Coarse regular granular structure, Figs. 1 and 8 (50 diameters). (*b*) Excess of foreign matter, such as oxides, slag and enclosed gas, Fig. 2 (reduced 50 percent). Either characteristic resulted in relatively poor service. On the other hand, in rails of the same general composition giving satisfactory service, we have found (*c*) a generally fine, interlocking, broken up, granular form, with (*d*) Relative freedom from foreign matter and gas. Fig. 3, which will be referred to again, represents a coarse example of this finer structure, and Fig. 4 shows a characteristic structure of the head, reduced 54 percent, showing freedom from foreign matter.

Upon comparing the above results with those obtained in our mill inspections we found complete accordance, for the rails of the character *a-b* proved exceedingly fragile under the drop-test of 2,000 pounds falling 20 feet. A section of rail, Fig. 2, from center of head, gave an elongation of only 2 percent in a 2-inch section, with tensile strength of 118,000 pounds per square inch. The analysis of these rails varied from:

Carbon, .55 to .63 percent; phosphorus, .075 to .104 percent; manganese, .75 to 1.20 percent, and sulphur, .034 to .07 percent.

In contrast with this, rails when of the structure *c-d*, with the above composition, showed a marked toughness under the drop-test, and rail Fig. 4 stood fourteen blows of the drop without fracture, turning after the first and third blows, and successive odd numbers. The composition was: carbon, .644 percent; manganese, 1.09 percent; phosphorus, .081 percent; sulphur, .076 percent, and a test piece from a similar rail, center of head, gave an elongation of 13 percent in 2 inches, with tensile strength of 132,000 pounds per square inch.

These marked differences were not at all unexpected, for they simply confirm the work of others. Mr. J. E. Stead, for instance, says: "It is clear that the junctions (of the grains) are a safeguard, and the more junctions there are, the more reliable will the steel be." And again, "it would seem to follow, then, that the smaller and finer the grain, the safer the structure." This coincides with the researches of Brinell, Sauveur and others.

Next, in order to find out how these results tallied with those of practical track service, we made a comparison upon a lot of about 50 rails which fractured in track, each having had a life of less than five years. They came from different points upon our lines, and had approximately the composition stated above. A number of different mills were represented, but all of the rails could be grouped under the head of "coarse-grained," or of "finer grain," and upon figuring the fractures in each class to a basis of equal tonnage during the five years, we found an average of fifteen fractures of the coarse-grained material to one fracture of the relatively finer-grained, and in each case of fracture of the latter, we found that the weakness was due to pipes in the steel—defective cropping. This comparison, of course, applies strictly only to actual fracture, but it is well known that the same conditions which here have produced fracture also contribute to rapid wear in service. Mr. P. H. Dudley states: "As I have already observed, the most serviceable rails have a fine structure and small mineral aggregates, though in many cases the so-called chemical composition is identical."

In our own work upon bearing metals we have invariably found these conditions true, namely, coarse grain and presence of foreign matter result in relatively rapid wear in service. Turning now to the influence of mill methods upon the size of grain:

During the past ten years marked progress has been made in knowledge regarding the metallurgy of steel, and, thanks to the work of efficient investigators, the general relations between structure of steel and its physical properties are so well proven that cause and effect in many conditions of mill practice have become matters of definite certainty. The cause of coarse granular form is clearly shown in Prof. Sauveur's valuable papers of 1893 before the American Institute of Mining Engineers, and of 1899 before the Iron and Steel Institute. Proposition V of the latter states: "The higher the temperature above W from which the steel is allowed to cool undisturbedly the larger the grains," and Proposition VI, "The slower the cooling from a temperature above W the larger the grains." In other words, stopping thorough working of the steel while materially above the recalescent point, and allowing to cool slowly, can result only in coarse granular structure, and such structure, other things being the same, has been proved by Prof. Sauveur, Prof. Martens, Mr. C. H. Ridsdale, Mr. R. G. Morse, Dr. Sargent and others, to lower elongation and reduction of area, and to lessen the general toughness of the steel. Prof. Roberts-Austen, also, in summing up the results of the important investigation made by the British Government after the St. Neots disaster, concerning loss of strength in rails, states: "The character of the grain, therefore, affords valuable evidence as to whether the rail has been rolled at a suitable temperature. * * * The relative amounts of the pearlite and ferrite, as well as the relative dimensions of the respective granules, afford very valuable indications as to the qualities of the rail and its probable durability."

*Read at a joint meeting of the American Institute of Mining Engineers and the Mining and Metallurgical Section of the Franklin Institute at Philadelphia, May 14, 1902. The author is chemist to the Philadelphia & Reading Railway Co.

It will thus be seen that the unsatisfactory results which our service tests show with this coarse granular structure are merely the natural accompaniments of such character, and the entire investigation proves clearly the immense practical advantage in the betterment of quality which is being derived from the researches of metallurgists and metallographists, especially during the past decade.

The mills have not been slow to recognize the need of fine-grained structure in the heavier sections, and during recent years great efforts have been made to effect the change, and much progress has followed. At first, attention was directed merely to the finishing temperature; that is, the temperature at which the rail came through the last pass, without particular regard to the initial temperature of the ingot or bloom. In fact, high initial temperatures tended to prevail out of deference to the rolls, especially where these were light, or where the power was limited, and under such conditions it became necessary to hold the rails before running through the last passes, in order to finish at the desired temperature. The result of this procedure, as pointed out by Mr. S. S. Martin recently, was to produce a fine granular form to the depth to which the working of the steel extended during these last passes, or to a depth of from ⅛ to ¼ inch below the surface of the head.

Our own studies has proved the correctness of this statement, and further showed that the size of grain at center of head was but little affected by such treatment, as shown in Fig. 5 (50 diameters). A surface toughening resulted, which would be of temporary benefit only, and could hardly from its nature cause any very decided increase in durability in service. The character needed is not a fine-and-coarse irregular structure, but one fairly fine even at the center of head, and practically amorphous at the surface; just such a structure, in fact, as we find in the rails of lighter sections rolled before the heavier sections came into use. Fig. 6 (50 diameters) represents the structure at center of head of a 67-pound rail which was rolled and laid in 1864, and which withstood 34 years' heavy traffic, and since then has been in use in side track. The analysis is:

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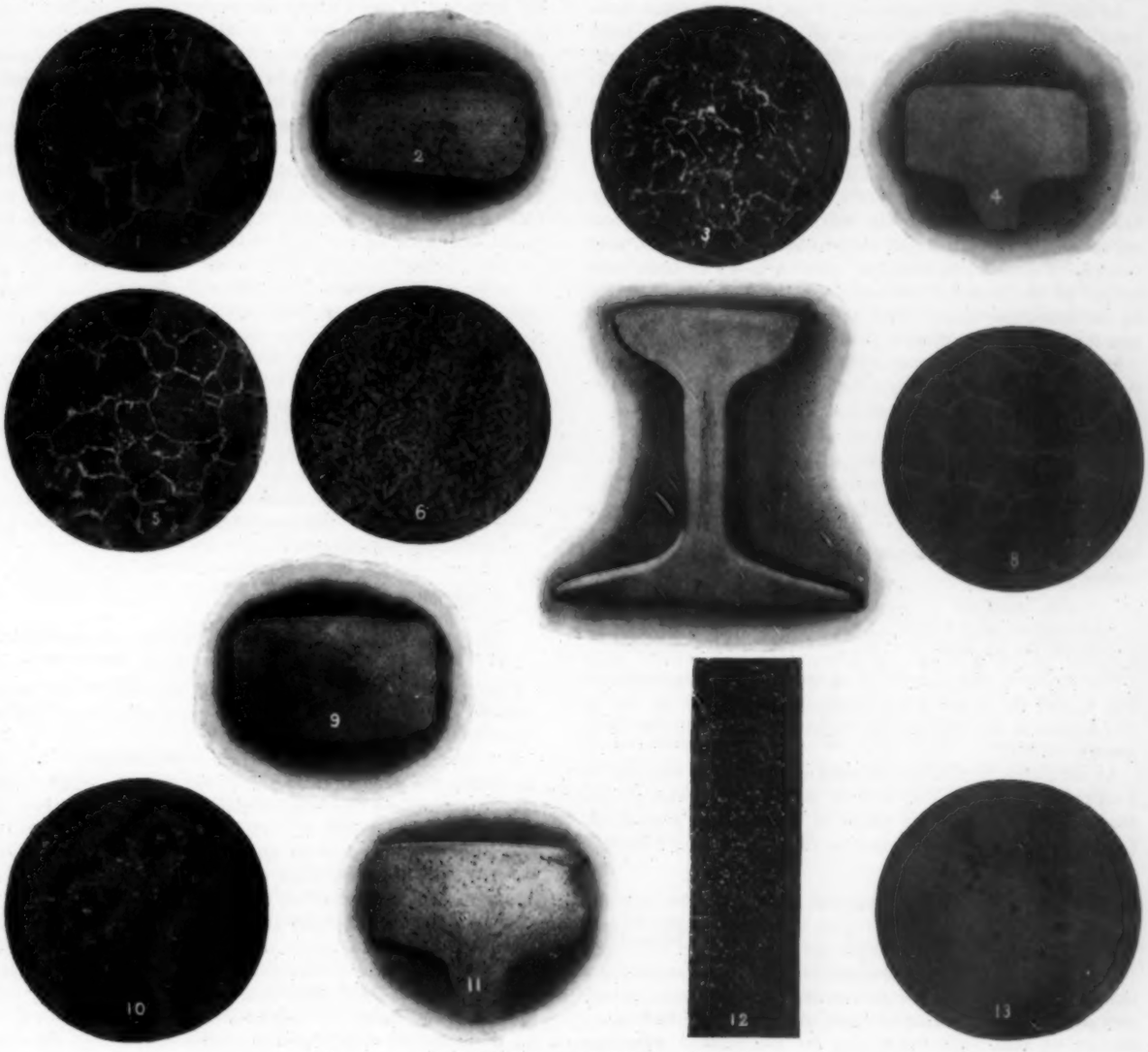
|---|---|
| Carbon | .33 percent |
| Phosphorus | .039 percent |
| Manganese | .390 percent |
| Sulphur | .030 percent |
| Silicon | .070 percent |



EXPLANATION OF PLATES.

Fig. 1.—x 50 diameters. Center of head. Coarse open grain which wears rapidly in service. Fig. 2.—(Reduced 50 per cent.) Foreign matter which causes brittleness. Fig. 3.—x 50 diameters. Finer granular form which gives much better service than Fig 1. Fig. 4.—(Reduced 54 per cent.) Freedom from foreign matter. Fig. 5.—x 50 diameters. Center of head. Rail held before last two passes. Fig. 6.—x 50 diameters. Center of head. Very durable and slow wearing. Thirty-four years of hard service. Fig. 7.—(Reduced 64 per cent.) Homogeneous head. Rail, Fig. 6, after thirty-four years' service. Fig. 8.—x 50 diameters. Rapid wearing rail, stood drop test. Fig. 9.—(Reduced 50 per cent.) Foreign matter in Fig. 8. Fig. 10.—x 50 diameters. Center of head. Fig. 8 Re-heated. Fig. 11.—(Reduced 52 per cent.) Mashed down in track after six months' wear. Fig 12.—x 1¼ diameters. Fracture of Fig. 11, showing unwelded seams. Fig. 13—x 50 diameters. Oxide spots in Figs. 11 and 12, preventing welding.

Fig. 7 (reduced 64 percent) represents the appearance of this rail in 1898, etched, and shows that it had evidently been greatly worn from its original section, and contained a pipe in the web. The metal, however, has not "flowed over" upon the side of head, although the steel is comparatively soft. In explanation, however, it is to be noted that the head is almost free from foreign matter, and that the structure even at center of head is exceedingly fine.

"Flowing over" has been found by us to be practically independent of the composition, and caused generally by unwelded seams due to presence of foreign matter and gas in

the steel. In 1890 Dr. C. B. Dudley stated that his studies of such rails "would seem to indicate that disintegration or crushing of steel is largely a resultant of lack of soundness in the ingot, and is more mechanical than chemical, except in so far as chemistry may be responsible for the soundness of the ingot." In some cases, however, we have found almost complete freedom from unsoundness, but in each such instance a coarse granular structure was present. Mr. P. H. Dudley also states: "The mineral aggregates are large and friable, and the surface of the rail breaks down more than 1-32 of an inch in depth, readily flowing under wheel pressures." Thus, it seems clearly established that such condition may arise from marked weakness due to any cause, whether unsoundness of the metal, weak, coarse structure, or even such composition or form that the rail is unable to support the load and becomes flattened.

In the case of the 67-pound rail, Figs. 6 and 7, which gave excellent service, the composition is exceptionally free from defects. It is, however, a matter of common experience everywhere that the composition of these old rails of light sections is exceedingly irregular. As Captain Robert W. Hunt expressed it last year before the American Institute of Mining Engineers, "they were high in carbon and low in carbon; high in manganese and low in that element; high in phosphorus and higher in phosphorus; but they all gave good service." One such rail taken from our tracks contained .160 percent phosphorus with .44 percent carbon, but still had given long service. The one characteristic common to all of these rails is that of fine granular structure; in fact, it was necessitated by the conditions under which they were rolled, for the steel was thoroughly worked well down toward the critical point.

In order to note the exact influence of structure upon quality, we took at random from a heat which passed the drop-test a rail having the following composition:

| | |
|---|---|
| Carbon | .56 percent |
| Phosphorus | .102 percent |
| Manganese | 1.08 percent |
| Sulphur | .056 percent. |
| Silicon | .147 percent |

turned down a section at center of head and obtained the following results:

| | |
|---|---|
| Tensile strength | 128,400 pounds per square inch |
| Elongation in 2 inches | 8½ percent |
| Reduction of area | 3½ percent |

The structure (50 diameters) at center of head is shown in Fig. 8, and the etched head (reduced 50 percent) in Fig. 9. The former is very coarse, but the latter is tolerably free from foreign matter.

An adjoining portion of the same rail was then reheated to a cherry red, and let cool at once in the air. A test section was then turned from the center of head, having a structure (50 diameters) represented in Fig. 10, and gave the following results:

| | |
|---|---|
| Tensile strength | 129,500 pounds per square inch |
| Elongation in 2 inches | 12 percent |
| Reduction of area | 10.1 percent |

It is thus seen that the change shown in the structure has caused an increase of strength, an increase of nearly 50 percent in elongation, and an increase of nearly three-fold in reduction of area, fully accounting for the marked difference observed in service between the coarser and the finer structures, respectively. As Mr. William R. Webster stated at the Paris Congress of the International Association for Testing Materials, in 1900: "The matter of vital importance is to work steel in such manner that it is not put in service with this coarse grain."

In the foregoing we have seen that coarse granular structure seriously weakens steel, and that brittleness under the drop-test is found when in addition the metal is "burned" or contains an excess of foreign matter. The result of a large number of tests further proves that fracture under the drop-test seldom occurs if the steel is homogeneous and free from unsoundness. In other words, mere ability of rails of this composition to withstand the drop-test is no guarantee of fine granular structure, and consequently other tests of quality are essential to necessitate durability. Figs. 1 and 8 represent rails of coarse granular structure which passed the drop-test with good deflection, but such rails do not give satisfactory service.

The foreign matter and gas which produced brittleness was generally found in small cavities or lines scattered throughout the section, but especially prominent within ¼ inch from the surface around the head, and caused a series of unwelded seams—elements of weakness. The appearance was usually similar to that of Fig. 2. Rails which did not fracture under the drop-test at the same rolling were found comparatively free from this enclosed matter around the outer portion of the head, though in some cases a considerable proportion was found nearer the web. Still, the solid band of homogeneous material around the outside of the head gave sufficient toughness to the rail to enable it to resist the force of the drop. It is of interest, however, to note that an excessive proportion of foreign matter and gas in rails may not cause failure under the drop test in cases where the grain is comparatively fine, since the strength incident to such structure may offset the weakness caused by the unsoundness. A typical case came under our observation not long ago. A lot of 90-pound rails had been rolled, and had passed the drop-test without a single failure, and the average structure was somewhat finer than that represented in Fig. 3. After being in tracks for a few months a number of the rails began to flow over and break down under the heavy traffic to such an extent that replacement became necessary. Upon inspecting the track we found that some of the rails from the same rolling were in good condition, showing little wear, while others next to them were badly broken down, often along the entire length. The defective rails were not confined to any one heat, but were scattered throughout the rolling. Sometimes the outside edge of a rail was broken down, and sometimes the inside edge. Some in a given heat were showing good service, while one or more from the same heat were defective. Eighty-pound rails of practically the same composition had previously been in this track and had given good service, and had not been broken down by the same traffic.

In order to get at the cause of the difficulty, sections of some of the defective rails were obtained, and showed the following average composition:

| | |
|---|---|
| Carbon | .544 percent |
| Manganese | 1.005 percent |
| Phosphorus | .078 percent |
| Sulphur | .090 percent |
| Silicon | .120 percent |

There was nothing abnormal in this, and many rails of essentially the same composition have given good results under heavy traffic conditions.

We next investigated the structure of the steel. Fig. 12 represents the general character of the fracture magnified to 1½ diameters, and is a longitudinal section down through the head of the rail about ½ inch from the center line. The striations which appear are unwelded seams which break up the continuity of the steel and produce planes of weakness. In order to learn the extent of these defects, we polished off a full section of the rail and etched lightly with iodin, finding that the entire surface of the section was covered with lines of unwelded seams, as represented in Fig. 11 (reduced 52 percent). Microscopic examination showed that the steel contained a large number of particles of foreign matter—Fig. 13 (x 50 diameters)—and that some seams were coated with blue and brownish films, evidence that the steel had been burned, and fully accounting for the failure to weld. Fig. 3 gives a section from center of head, and proves that the rail was worked and finished at a moderately low temperature, and that owing to the consequent fairly fine structure the rails withstood the drop-test in spite of the weakness due to defective manufacture. When laid in track, the weight of the rolling stock caused the unwelded seams to slip apart at the portions where the greatest strain came, thus resulting in the breaking down of the rails. The upper right hand corner of Fig. 11 shows where a sliver ½ inch thick was forced out of the side of the head along one of the unwelded seams for a distance of several feet, and the crack along the seam extended nearly to the top of the head.

This instance proved conclusively that reliance could not be placed upon the drop-test to ensure homogeneous, solid steel, and it is generally well known that rails of laminated steel

may give even a better test under the drop than if composed of solid metal of the same composition.

The above results clearly verify the statement of Mr. P. H. Dudley that solidity and continuity are quite as important as a good microstructure.

As to the origin of foreign matter in steel, it is evident that it must be due to defective mill practice either in the manufacture of the steel, including teeming and settling; in burning of steel in soaking pits—or in blooming furnaces, if the latter are used,—or in cropping blooms or rails; in any event, it is an unquestioned proof of defective mill practice, and is easily avoided if so desired.

In order to insure the most durable rail of a given composition, our service results, as shown above, indicate that there must be—

(1) Freedom from brittleness.
(2) Absence of unsoundness.
(3) Fine granular structure.

(1) Brittle rails are eliminated by the drop-test of 2,000 pounds falling 20 feet upon a rail-butt from the top of the ingot, one rail from each heat being tested, or, in case of fracture, two more being taken from the tops of other ingots of the same heat; fracture of two out of the three causing rejection of all rails in the heat.

(2) Absence of unsoundness is best insured by careful inspection throughout the manufacture, and by specifying a definite proportion of cropping.

(3) Fine granular structure is necessitated by specifying, under definite conditions, the shrinkage of the rail after leaving hot saws—an idea suggested by Mr. Wm. R. Webster.

A shrinkage limit is in operation in most of the mills today, but it must be borne in mind, as pointed out by Mr. Martin in the paper above referred to, that specifying merely the distance between hot saws does not compel presence of fine grain clear to center of head. Such structure will not result unless the reduction in the passes after the holding is sufficient to work the steel thoroughly to the center. What is needed is a moderately low initial temperature, sufficient work to render the steel solid, the speed of train and extent of reduction being such that with rapid rolling—without undue holding before or in the last passes, and without artificial cooling subsequently—the distance between hot saws shall not exceed a specified amount.

Under the above conditions, with a given composition, the extent of shrinkage of the rail after leaving hot saws may be made a definite guarantee of size of grain in sections of a given weight, and if the limit is placed at 5½ inches for a 30-foot length of a 90-pound rail, coarse grain even at center of head is practically impossible.

It is, of course, obvious that mere fine grain does not render certain freedom from brittleness, as, for instance, in the case of the St. Neots rail above referred to, where the steel was fairly fine-grained, but was fragile owing, it is said, to presence of martensite due to rapid cooling from a high temperature. Such composition was, however, evidently caused by a very exceptional accident in mill practice, and is carefully guarded against under normal conditions.

In working toward the most efficient practice in rail rolling, valuable aid has been given during the past few years by Committee No. 1 of the American Section of the International Association for Testing Materials, and Mr. Wm. R. Webster, the chairman, deservedly receives great credit for his efforts in bringing together the various conflicting interests, and in formulating proposed standard specifications of various materials of construction. The specifications for steel rails in particular have aroused wide discussion. In its present form we regard it as tentative, since it merely specifies the quality which, since the introduction of the heavier sections, has everywhere been found rapid wearing and unsatisfactory. It does not ensure durable material, and it does not represent the best American practice. It will, however, serve as a basis to which the necessary additions or modifications can be made, and also its effect in provoking discussion will be of assistance. If so drawn as to represent the best American practice, it would benefit the railroads as a class, and would undoubtedly be of great commercial value to the mills as an influence upon foreign orders, and would go far toward proving that many rail failures and cases of brittleness attributed abroad to chemical composition have been simply results there of defective mill practice which would not be found under the given best American practice. As an instance, we may cite the statement of Mr. C. P. Sandberg before the International Railway Congress in 1901, that he made some experimental tests with rails containing up to .60 percent carbon, and met with complete failure. The rails were brittle, and broke under a drop-test of 1 ton falling 10 feet. The carbon ranged from .56 percent to .62 percent. In contrast with this we have the regular practice of our American mills, where, as shown above, failure under the drop-test of 2,000 pounds falling 20 feet seldom occurs, even with carbon considerably beyond the .60 percent limit, provided proper care is exercised in manufacture.

The specifications proposed to the American Railway Engineering and Maintenance of Way Association are an improvement over those of the International Association in inserting a shrinkage clause, but the wording of the latter is open to the objection cited by Mr. Martin, and would ensure merely fine-grained material upon the immediate outer surface of the rail.

Every successful specification is of necessity based directly upon the teachings of actual service. In order, then, to aid the mills in working out the most efficient standard practice, it is greatly to the interest of every consumer to make known the practical service values of the various materials. Our object in entering upon the investigation has been, naturally, to secure the greatest degree of safety and durability in the tracks of the Reading Railway, but we have brought the results to your attention in the hope that a full and free discussion of facts may be of general benefit in tending toward the production of uniformly durable material.

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The report of the Southern Iron Committee for June shows the total shipments from the Southern field to have been 159,407 tons, against 169,407 tons in May. Pig iron, 147,322 tons; cast iron pipe, 12,085 tons. The steel shipments from Ensley amounted to 8,490 tons, a decrease of nearly 3,000 tons as compared with shipments during May. The shipments made last month equalled the production. It is expected that the report for July will show a great decrease because of the suspension of work at the coal mines.

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The Hocking Valley Railroad has just placed with the Cambria Steel Co. an order for 4,000 tons of 80-pound rails, delivery to begin in January.

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The quarterly report of the earnings of the Tennessee Coal & Iron Co. shows that trade surplus earnings for the quarter amounted to about $295,000 as compared with $245,000 in the preceding quarter. The surplus for the six months ended June 30 amounted to $530,000.

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Statements furnished by the railroads entering Pittsburg to the municipal authorities show that the cost of railroad improvements made in that city within the last two years and now under way will aggregate $35,000,000. A large proportion of this expense has been caused by the steadily increasing demands of the United States Steel Corporation for additional transportation facilities.

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The Farrel Foundry & Machine Co., of Ansonia, Conn., has shipped a large lot of crushing machinery, etc., to Porto Rico for use on the Centrale Guanica, owned by the South Porto Rico Sugar Co.

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At the annual meeting of the stockholders of the National Rolling Mill Co., Hartford, Ind., held recently, directors were elected as follows: E. B. Mitchell, H. B. Smith, J. R. Johnston, S. N. Bradshaw and E. H. Jones, E. B. Mitchell was elected president; H. B. Smith, vice president, and E. H. Jones, secretary and treasurer.

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The Colton & Wright wire mill, at Palmer, Mass., which has been closed several months, will be reopened, giving employment to 200 men.

## CONSOLIDATED LAKE SUPERIOR CO.

The following, specially prepared for the *Bulletin* of the American Iron and Steel Association, is a correct statement concerning the Clergue enterprises at the Sault:

The Consolidated Lake Superior Co., which conducts large operations on both sides of the St. Mary's River, located principally at the town of Sault Ste. Marie, Ont., is chiefly a Philadelphia enterprise, having been organized by Philadelphians and the larger part of its capital having been supplied by Philadelphia capitalists. The general offices of the company are in the North American building in Philadelphia, where all the financial operations of the company are centered. The various industrial operations controlled by it are directed from the offices at Sault Ste. Marie, Ont. The Consolidated Lake Superior Co. has an authorized capital of $35,000,000 7 percent preferred stock, and $82,000,000 common stock, and the operations thus far undertaken represent an actual expenditure of about $25,000,000. The company is the parent organization, which owns the stock of a number of subsidiary corporations by which the various industrial operations are conducted. Among these subsidiary interests are the following:

(1) Lake Superior Power Co., which owns lands and water rights at Sault Ste. Marie, Ont., with a power canal which yields about 20,000 h. p., this being supplemented by a second canal on the Canadian side soon to be constructed; (2) the Michigan Lake Superior Power Co., which owns the water power rights on the Michigan side and is constructing a canal which will yield over 40,000 h. p. and which will be complete and in operation during the present year; (3) the Sault Ste. Marie Pulp & Paper Co., which operates a ground wood pulp mill capable of producing 100 tons a day of pulp and also a sulphite mill of about 60 tons a day, both of which are on the Canadian side and operated by power from the Canadian canal; (4) the Tagona Water & Light Co., which supplies water and light to the town of Sault Ste. Marie, Ont.; (5) the Algoma Steel Co., Ltd., which operates a Bessemer steel plant and rolling mill; (6) the Ontario Lake Superior Co., which, while controlled by the Consolidated Lake Superior Co., is a corporation that owns and controls a number of subsidiary interests on the Canadian side, among them the Algoma Central & Hudson Bay Railway, which is now under construction northward from Sault Ste. Marie to the Helen and Josephine mines in the Michipicoten District, Ontario; and the Algoma Commercial Co., which conducts extensive land, timber and mineral operations upon the lands granted by the Canadian government for constructing the road.

Mining operations are being conducted upon an extensive scale at the Helen iron ore mine, which is located about 12 miles from Michipicoten harbor, and the ore is carried in the company's boats to the lower lake ports. In the vicinity of Sudbury extensive mining operations are conducted in the nickel and copper deposits. Smelters have been erected for the treatment of portions of the ore at the mines, while part of the ferro-nickel ore is roasted at the works at Sault Ste. Marie, Ont., and made into briquettes, which are subsequently smelted into ferro-nickel—a pig iron containing a high percentage of nickel. The steel rail mill, which rolled its first turn on May 5, is now running regularly and is rapidly reaching its full capacity of between 500 and 600 tons per day. The officers of the Consolidated Lake Superior Co. are: President, E. V. Douglas; vice president and general manager, F. H. Clergue; vice president and treasurer, T. C. Search; vice president, F. S. Lewis; vice president, E. C. Lee; secretary, W. P. Douglas; assistant secretary and assistant to president, Edward H. Sanborn.

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The plant of the United States Railway Signal Co., at Fostoria, O., was damaged by fire to the extent of about $10,000 July 17. Insurance, $3,500.

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Fred B. Oliver, of the Oliver Machine Co., Athol, Mass., has formed a partnership with F. T. Whitney, of Boston. The new firm will be known as the Oliver-Whitney Co. New equipment is being purchased and the capacity of the plant is to be doubled. Mr. Oliver will take charge of the manufacturing and Mr. Whitney will represent the business on the road.

## LACKAWANNA STEEL CO.

Some interesting details, not hitherto published so fully, concerning the new plant of the Lackawanna Steel Co. at South Buffalo, are contained in the report of the British Commission on the American Iron and Steel Industry, recently reviewed in these columns. From the portion of the report prepared by Mr. Axel Sahlin we take the following:

"At Buffalo is now being constructed one of the largest iron and steel plants in the world. Though the plant is as yet far from completion, enough has been done to impress the visitor most forcibly with the boldness of the design and the immensity of the undertaking. The Lackawanna Steel Co., who hitherto have successfully operated what in most countries would be considered an extra modern rail plant, with steel works and furnaces, at Scranton, Pa., found that the cost of railway transport for lake ore and for marketing their product was placing them at a disadvantage. They therefore secured a level tract of land measuring 1 mile by 3½ miles, at Stony Point on the shore of Lake Erie, 9 miles south of Buffalo. This plot offers rock foundation at a depth of 80 feet, a deep water front accessible for the largest lake steamers, abundant and pure water from the lake, direct connection with 27 large railway systems, navigation over the whole system of the Great Lakes, and through the Welland Canal, with 14 feet of water, and St. Lawrence River to the ocean and the world at large, and finally through the Erie Canal, having 10 feet of water, directly to the Hudson River and New York. It would be difficult to find a place better supplied with lines of communication. The company own their own mines in the Lake Superior district, as well as the Port Henry mines in Northern New York and large coal territories in Western Pennsylvania. Besides, they control a considerable share of the Cornwall ore mountain in Pennsylvania, and several furnaces located close to the same.

"It is their intention to wash and crush the coal at the mines in Pennsylvania, to dry it in hot air storage houses having concrete hopper-shaped floors. The coal, when dry, will be carried to the Buffalo plant, where it will be unloaded into a receiving hopper. From this hopper, it will be shot by gravity into a hydraulic press, in which it will be shaped into blocks, each block making the charge for one by-product coke oven. The plant is laid out for 1,000 of these ovens, but at present only 564 are being built and provided with a complete plant for saving by-products. The coal will be charged into coke ovens on a peel attached to the coke pusher. The pusher will deliver the ready coke onto an apron or crate about 25 feet by 10 feet by 4 feet, which will be lifted whole onto a truck, and brought to the blast furnace hoists. The charging of the furnace will be arranged so that one coke oven charge will form a unit of fuel.

"A large harbor, 200 feet wide, is being dug out between the coke ovens and the furnaces. The coke will be carried through a tunnel under the harbor to the furnace yard. The ore ships arriving in the harbor will be served by four Hulett automatic unloaders carrying 10-ton grab buckets, and by six Brown bridge tramways arranged along the harbor and covering the storage yard. The same harbor will also serve for shipping the product of the plant.

"The plant is laid out for six furnaces, of which four are to be the largest in the world (110 feet high and 25 feet diameter at bosh). Two large new stacks are now under construction, while two of the Scranton furnaces have been torn down and are now being re-erected at the Buffalo plant.

"The large furnaces will be the first in the United States to be driven exclusively by gas engines. These engines will have single gas cylinders, and are being constructed in the United States. An output of 800 tons per day from each furnace is expected. Connected with the furnaces there will be Heyl & Patterson casting machines and one 300-ton mixer.

"Though it is a digression from my subject, it may be permitted briefly to describe the plant being constructed, as it was explained to me by Mr. Wehrum, general manager of the Lackawanna company: It covers, as far as it is now planned, a territory 1½ miles in length, of ¾ mile in width, leaving an unused plot for extensions and finishing departments of 2 miles in length and ¾ mile in width. Part of the iron taken from the blast furnace will be delivered into the

300-ton mixer. From the mixer it will be passed on to a Bessemer plant of four converters. The converters will also be supplied with iron shipped cold from the Cornwall furnaces and remelted in cupolas. The steel ingots are handled by two pairs of ingot strippers, and are forwarded to two blooming mills, and thence to the rail mill now being transferred from Scranton. Another branch of the works will deliver steel from the Bessemer plant through two tandem blooming mills to a three-high billet mill.

"On a parallel line with this first steel plant will be placed a Talbot open-hearth plant consisting of four 200-ton furnaces, followed by a reversing plate mill of English style with separate finishing rolls. Transfer arrangement between the open-hearth steel works and the plate mill will deliver steel ingots to universal plate, bar and shape mills standing alongside of the reversing plate mills.

"In line parallel with these mills follow extensive shops, foundries, blacksmith's shops, machine shops, etc., well built with steel frames, brick filling and slate roofs. Overlooking the whole is placed a magnificent general office building in colonial style. Never in the history of iron and steel has so large and many-sided a plant been planned and constructed simultaneously in all its departments."

### The Vote on the "Drawback" Tin Plate Proposal.

Several lodges of tin plate workers affiliated with the Amalgamated Association of Iron, Steel and Tin Workers have already held meetings for the purpose of considering the proposition growing out of the recent conference of their national officers with the American Tin Plate Co., namely, that they accept a 25 percent reduction on all plates rolled to replace "drawback" plates. Some of the lodges have accepted the proposition believing that it would be beneficial to the trade, while one or two of them have voted against the proposition. Every effort will be made by the officials of the Amalgamated Association to have a favorable vote on the proposition as they believe it to be to the best interest of the tin workers to accept it. Should the men desire to make better wages on the drawback plate than the 25 percent reduction permits, it has been pointed out that the limit of output could be removed here and practically the same wages earned as under the scale now in force.

A similar reduction in wages on tin plate for export is now being considered by the tin house workers, but no definite action has yet been taken. The matter will probably be decided on August 1.

(Special Telegram.)

PITTSBURG, July 23.—President Schaffer of the Amalgamated Association in an interview states that a majority of the lodges that have voted on the proposition to take a 25 percent reduction on drawback plates have voted favorably. A number of the lodges are still to be heard from, however.

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At a meeting of the various district vice-presidents of the Amalgamated Association held at Columbus last week, special scales for plate mills having improved machinery were signed. The scales for the mills of the Republic Iron & Steel Co. at Bessemer, Ala., and the Tennessee Coal, Iron and Railroad Co. at Birmingham, Ala., were agreed upon. The scales are special and will not be incorporated in the general scale book of the Association.

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The Sheffield Car Co., Three Rivers, Mich., is building a 100x60 feet, one story brick structure, steel truss with slate roof and vitrified floor.

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The Chesapeake & Ohio railroad is preparing to rebuild the machine shops and enlarge the railroad yards at Lexington, Ky.

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Borst & Hetherington are completing a sewing machine plant for the Foley & Williams Mfg. Co., Kankakee, Ill. The principal building will be a three-story structure, 357x121 feet, beside which there will be a two-story office building, 28x73 feet, and a power house, 75x55 feet. The work will cost about $70,000.

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Benjamin Lamb is erecting a machine shop at Plainville, Conn.

### FIVE MORE STEEL FREIGHTERS.

During the past week, the American Shipbuilding Co. has obtained contracts for five steel freight steamers. The company now has contracts for twenty-eight vessels to be delivered next year. The total cost will be over $7,000,000 and nearly 70,000 tons of steel will be used in the construction.

Of the five latest contracts, two were made by G. A. Tomlinson for the Duluth Steamship Co. These boats will be 416 feet keel, 50 feet beam and 28 feet depth of hold, to be ready for service May 1, 1903. The new boats will have triple expansion engines with cylinders 20x33½ and 55, by 40 inches stroke of piston, and steam will be furnished by two Scotch boilers 13 feet 2 inches by 11 feet 6 inches. The steamers will have six cargo compartments and will cost $280,000 each.

Another contract is from the estate of the late Capt. W. S. Mack and others. The new vessel will be 374 feet over all, 254 feet keel, 48 feet beam, and 28 feet deep. She will have triple expansion engines and two Scotch boilers. The boat will cost about $230,000.

Two new vessels were ordered by the Provident Steamship Co. A. B. Wolvin believes in the principle of greatly increasing the number of hatches on the big cargo carriers. It is provided that it shall be put in effect in the two new boats for which he awarded contracts today on behalf of the Provident Steamship Co. Each of these boats will be 400 feet over all, 380 feet keel, 50 feet beam and 28 feet deep. Each steamer will have 21 hatches. The new Wolvin boats will cost about $255,000 each. The steamer Hoyt, recently launched at West Superior, is the first boat of the Provident fleet.

With the contracts now made every yard of the shipbuilding company will have all it can handle.

### New Tube Works at McKeesport.

The National Tube Co. has decided to erect a large addition to its tube plants at McKeesport, Pa. Some time ago officials of the company secured options on 35 acres in McKeesport, but as nearly $1,500,000 was asked for the property the options were not taken up and it was decided to seek a site elsewhere. Citizens decided to see what could be done and have succeeded in securing options on all but a very small portion of the property for about $750,000. When President Schwab, of the United States Steel Corporation was informed that the land could be acquired at about half the former price he notified the citizens' committee that the options should be closed, which was accordingly done this week. The cost of the improvements will amount to about $10,000,000 and will probably include the erection of an additional blast furnace at the Monongahela plant, the doubling of the output of the Monongahela steel plant and the doubling of the output of the pipe and tube mills and the present galvanizing department.

### Obituary.

W. H. Patterson, of Cleveland, a dealer in railroad supplies, died Monday, July 21, in his forty-fifth year.

Capt. E. A. C. Lohmann, a steel expert, died July 20 in Bethlehem, Pa., where he was employed by the Bethlehem Steel Co. He invented the process for hardening steel used by the Carpenter Steel Co., makers of the Navy's projectiles, and was with the Carpenter company for many years up to a short time ago. Capt. Lohmann was a native of New Haven, Conn., and was formerly prominent in the National Guard of Connecticut and New Jersey.

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The Meyer Furnace Co., Peoria, Ill., will erect a $6,000 brick building, two stories high, on site of the one destroyed by fire.

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The Union Machine & Boiler Co., of Cleveland, has been incorporated with a capital of $40,000 by W. E. Perkins, H. H. Johnson, M. B. Johnson, G. H. Hogsett and Joseph G. Russell. The new company will purchase and operate the plant of the River Machine & Boiler Co., of Cleveland, which has been in the hands of a receiver for some time.

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Steel cars will be turned out at the new works of the Structural Steel Car Co., at Canton, O., within 30 days. Much of the machinery has been placed in position.

## A STRIKE WITH SEVERAL MORALS.

A suggestive commentary on a recent strike and some phases of unionism exhibited in connection with it is contained in a circular letter sent out from the office of Acting Commissioner Du Brul of the National Metal Trades Association. Mr. Du Brul reviews as follows the strike at the works of the Canadian Locomotive Co. at Kingston, Ont.:

"The Canadian Locomotive Co., at Kingston, Ont., have had a strike on hand for some time. It was a complicated case, but has now simmered down to one point, namely: that the company take a handy man off a so-called machinist's job, replace him with a machinist admittedly not competent to do the work, and agree never to promote a handy man to what the union claims is machinists' work. The case has many twists and turns and side issues, but the main facts are as follows:

"The company makes locomotives, and on April 3, 1902, applied for admission to this association. During the time the ballot was proceeding, demands were made on them by the local union substantially as follows:

"That the company must give preference in employing machinists to members of the I. A. of M.; that 54 hours shall constitute a week's work; time and one-half for all overtime and legal holidays; the mimimum of wages shall be 20 cents per hour for all journeymen machinists; there will be one apprentice for every shop, and in addition not more than one apprentice to every five machinists, and any boy engaging himself to learn the trade of machinists must serve at least four years, and that the age of boys be not less than fifteen, nor more than 21 years, but after having served their apprenticeship the rate of wages shall be $1.50 per day for the first six months and $1.75 for the next twelve months thereafter, after which they shall get the minimum rate; when reductions in the force are necessary, men who have others dependent on them shall be given preference of employment, seniority and proficiency to govern, etc.

"In the matter of grievances it was demanded in the event of failure to agree with the company that the case should be referred to the representatives of the I. A. of M. and the company, and subsequently to a board of arbitration.

"The company faithfully followed the lines of procedure laid down in the Declaration of Principles, advising the men that they believed in arbitration and were willing to submit the question of hours and wages to a board. Numerous conferences were held between the company and its employees, and without result. The local union also tried its hand, and even a vice president of the I. A. of M., who from the first directed matters, appeared at intervals.

"Finally, it seemed as if matters would be settled, but some information was had that there was bound to be a strike, that the company needed a lesson and that the union proposed to bring the company to terms and 'show them how to mind,' or words to that effect. Pending negotiations the handy-man question arose, and this has now become the main point at issue. On this point only, the machinists of Kingston are now on strike, backed by their international officers and receiving benefits from the international treasury; all other questions were eliminated by the company conceding some points and the machinists doing the same, leaving this question the only one in dispute.

"A handy man named Graham had for years been helping in the fitting of axles and setting of tires. The man in charge of this work, whom Graham had been helping, left the company's service some years ago. During a business depression Graham continued to do the job whenever it turned up, and did better than any man in the shop. . This condition of affairs did not suit the shop committee, who told the foreman that it was a machinist's job, and Graham should not be allowed to continue. The foreman said nothing to the management, but put a machinist to look after the work and *put Graham to instruct the machinist.* The humor of the situation was not lost on the handy men, nor on the machinists, either.

"The gaiety of Kingston was further heightened by the fact that the aforesaid machinist never did become as proficient as Graham, who always had to take complete charge of every difficult job of the kind while the machinist stood by and tried to learn how. This led him to threaten to fix things for Graham some day.

"Now, while negotiations were proceeding along the lines of wages, etc., it so happened that a hurry job of wheels had to be got ready one afternoon, and the machinist in question was notified of the fact in the morning. That afternoon he failed to show up, and Graham did the work. Next morning Mr. Machinist ran to the shop committee with a demand that they strike or have Graham discharged. As other matters were pending and they had the 'classifications' card ready to play they told this man to let the matter rest, and it would be attended to in due time. He strutted about, telling his story and what they would do to Graham by and by, and finally succeeded in becoming an unbearable nuisance and was discharged. Graham was given the job permanently, as he deserved, and is admitted by all to be the most competent man in the shop on that work. Then the machinists added to their previous demands the following:

"KINGSTON, ONT., April 21.

*"To the Canadian Locomotive Company:*

"GENTLEMEN—The undersigned, constituting the executive committee of Ontario Lodge No. 368, of the International Association of Machinists, make the following demand, viz.:

"That no handy man shall be advanced to the position of machinist, no matter how long he has been employed on this class of work, nor how competent he may become; that is to say—he shall not be employed on any vise, lathe, planer, shaper, milling machine, slotting machine, or boring mill.

"We further demand on behalf of the same lodge that Graham shall be taken off wheel job recently given him, and said job shall be given to a machinist.

[Signed.]

"J. MCWATER,
"G. A. SHARPE,
"CHAS. PAIDEN,
"W. J. PAINTER.

"The company begged and pleaded with the committee to withdraw this demand, trying to show how unfair, how unjust, how brutally tyrannical such a course would be. But, no, the demand had to stand. And, mind you, most of the so-called machinists had been handy men themselves. Now, the Iron Workers' Helpers' Union, hearing of the proposed outrage, immediately called on the company to refuse it, and pledged their earnest support to their employers in case the machinists struck. The Iron Workers' Helpers' Union was affiliated direct with the American Federation of Labor, having no National union of its own. It is formed in Kingston of the helpers employed in the shops assisting machinists, blacksmiths, boiler makers and molders. The company wanted to know what the promised support meant and asked if the handy men would do such work as they could which the machinists might leave. This, they said, they would do, since the company was making the fight for them and against an outrageous, unjust and unfair limitation of their opportunities on the part of the machinists.

"The company then again begged and pleaded with the machinists to withdraw this unfair demand, but they were firm. The company, as a trade, made many offers to compromise on other questions, but in the case of Graham it would not compromise. The machinists refused all offers and went on strike. Later on they realized their weakness and actually asked the Iron Workers' Helpers' Union to strike in sympathy. This astonishing proposition further increased the high glee of Kingston and has made the machinists and their officers the butt of the fun throughout the town.

"Very properly, the handy men not only refused to cut off their own heads, but took up the machinists' forsaken jobs, and, in many instances, have done more and better work than the self-styled competent machinists ever did. In one particular case an apprentice one and one-half year at the trade did a job in two and one-half hours that a prominent Union man always took six hours to do.

"The American Federation of Labor then took a hand and ordered the handy men to back up the machinists or lose their charter. Mr. O'Connell represented to Mr. Gompers that the Kingston Lodge was striking against low wages, excessively long hours and compulsory piece work. Now, Mr. O'Connell ought to know that the hours are, and have been for some time, fifty-five per week. He ought to know that the company has always expressed a willingness to pay as high wages as machinists get in Canada. As regards piece work—and he

still persists in confounding premium work with piece work—he ought to know that the company wrote the committee that members of the I. A. of M. would not be compelled to accept premiums, even if they could and did earn them, and that the company would never offer any piece work to members of the I. A. of M. But Mr. Gompers, acting on such information as was given him, sent a vice president of the A. F. of L. to take away the charter of the I. W. H. Union. These men, strong in the consciousness of right, gave up the charter very willingly. They are no fools, and have shown in the whole trouble a most forbearing spirit to the machinists, who sought and still seek to harm them. But they see the logic of the situation and can forsee the results. They are improving every day and will soon be machinists, and really competent ones, in spite of all the I. A. of M. rulings to the contrary. The sympathies of all classes in Kingston are with the company and the handy men. This association is supporting its members to the full, and this unjust strike is a 'gone goose' for the machinists."

### Queer Shop Ways They Have in Des Moines.

A newspaper published at Des Moines, Ia., has an enterprising journalist who recently wrote up a local foundry and machine shop. He told of the versatile manager of the plant and his ability to refit an old engine so that when it goes out of the shop "the purchaser can rest assured that he is buying no second hand stuff but an entirely new, modern and up-to-date machine." There are not many shops that can do as much and only exceptional equipment enables this particular concern to achieve such remarkable results. Only a complete reprint of the article will do full justice to the ability of the narrator but the account is too long for reproduction and the following extracts must suffice to show the amount of success attained in the description:

"The ——— Works is the owner of a large number of pattern plates and casts and any part of the ordinary machine can be made up and refitted in a very short time."

"Ordinarily there are twelve to fifteen men employed in the foundry room. Large quantities of pig iron are stored in the buildings adjoining the foundry. These bars of iron are thrown into a huge pot which sits over a hot coke fire. The molten metal is poured into the molds, where it is compressed for ten to twelve hours until the cooling processes have been completed. Then the sand in the press is torn away and the workman displays the piece which he has molded."

"The factory is supplied with ample power from a large engine. The steam power is connected to all parts of the shop by means of belts and the simple throwing of a lever brings a machine into action or causes it to come to a standstill."

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The Weimer Machine Works Co., of Lebanon, Pa., is building the following liquid cinder cars of 200 cubic feet capacity of its patent, which provides for the carrying out of the ladle while it is being poured: Lackawanna Steel Co., Buffalo, 10 cars; Colorado Fuel & Iron Co., Pueblo, Col., 20 cars; Crucible Steel Co. of America, Pittsburg, 6 cars; Lake Superior Power Co., Sault Ste. Marie, Can., 3 cars; Tube Steel Co., Wheeling, W. Va., 5 cars; National Tube Co., Wheeling, W. Va., 2 cars; Carnegie Steel Co., Braddock, Pa., 10 cars.

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The Ironsides Co., Columbus, O., reports a substantial increase of business during its fiscal year recently ended, with prospects for continued growth in the current year. Its manufactures comprise special lubricants for ropes, gears and machinery, and specially adapted for heavy rolling mill and other general gearing.

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F. R. Phillips, of F. R. Phillips & Sons Co., has just returned from a three months' trip in England and on the Continent making purchases of steel. W. Vernon Phillips sailed on the 19th inst. to follow up the shipments on the various contracts and in connection with new business. The company has shipped a very heavy tonnage of steel into this country.

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The Mineral Range Railroad will build a machine shop at Calumet, Mich.

### LAKE SUPERIOR IRON MINES.

An important sale of mining property on the Western Mesabi Range was made last week, when a tract adjoining the Deering Harvester Co.'s mine was purchased from the Itasca Mining Co. by the Cleveland-Cliffs Iron Co. Exploring is now under way and until further advanced no additional information concerning the plans of the purchasers can be given. The widely published report that the consideration was $1,000,000 is not correct. The property is a quarter of a mile northwest of the new town of Nashwauk to which settlers are rapidly going. The ore is pronounced by mining men to be of excellent quality.

Suit has been brought in the district court of Itasca County, Minn., by Austin M. McGindley and Henry S. Swift against Orvin D. Kinney, E. E. Hawkins, George H. Crosby, James H. Pearce, the Western Mesabi Development Co. and the Itasca Mining Co. to recover $85,000 which, it is claimed, is due plaintiffs on leases on lands in the iron ore belt in the western part of the Mesabi Range.

Ore is being loaded from the Lamont mine on the Menominee Range for the first time since the shafts caved two years ago. It is expected that the working force will be increased very soon from 30 to 100 and more added as soon as room can be made for them.

### Another "Revolution" in Foundry Practice.

A press dispatch from Trenton, N. J., tells of the incorporation of the International Foundry Co. with a capital stock of $5,000,000. We are told that the object of the new company is to acquire and develop certain patents already issued or to be applied for by Charles S. S. Szekely, Sr., New York, for casting iron in permanent molds. It is set forth in the charter that Szekely has a secret process, compound or tincture, for smearing the molds by which the iron when cast can be taken out without resorting to the usual practice in foundries of breaking the molds. The shrinkage of iron in cooling is an item of importance and this is ordinarily met by the yielding nature of the mold. A straight ingot might be readily removed but it is easy to imagine castings of so complicated a form that a "tincture" would of necessity have to possess considerable of a pull to get them out of a rigid mold. However this is probably what a promoter would term a mere manufacturing detail which will be "developed" later.

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Among the principal engine sales of the Allis-Chalmers Co. for June, 1902, are the following: W. F. Stewart Co., Flint, Mich., 18x36-inch 1890 frame Reynolds Corliss engine; Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., 22x48-inch 1890 frame Reynolds Corliss engine; Brown, Cary & Woodruff Co., Salt Lake City, Utah, 12x36-inch 1890 frame Reynolds Corliss engine; Tyee Copper Co., Ladysmith, Vancouver Island, 14x36-inch girder frame Reynolds Corliss engine; Kioto Traction Co., Kioto, Japan, 16 and 32x36-inch 1890 frame cross compound direct coupled Reynolds Corliss engine; P. A. Peterson, Rockford, Ill., 10x30-inch 1890 frame Reynolds Corliss engine; Virginia-Carolina Chemical Co., Richmond, Va., one 16x42-inch and one 20x42-inch girder frame Reynolds Corliss engine; Janesville Cement Post Co., Janesville, Wis., 14x36-inch girder frame Reynolds Corliss engine; Geo. T. Houston Co., Chicago, 28x48-inch 1890 Reynolds Corliss engine; Twin City Rapid Transit Co., Minneapolis, Minn., 46 and 94x60-inch vertical cross compound direct coupled Reynolds Corliss engine (3rd order); West Allis Malleable Iron & Chain Belt Co., West Allis, Wis., 12x30-inch girder frame Reynolds Corliss engine; London United Tramways, London, Eng., 26 and 54x48-inch vertical cross compound direct coupled Reynolds Corliss engine (2nd order); Pennsylvania Railroad Co., Pittsburg, one Riedler air compressor with air cylinders 15 and 24x36 inches, driven by cross compound noncondensing Corliss engine with steam cylinder 14 and 24x36 inches.

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The Birmingham (Ala.) Railway, Light & Power Co. has let the contract for its new car barn and machine shop. The buildings will be 140x400 feet each. The total outlay will be $150,000.

## PERSONAL.

George L. Brown, recently connected with the New York Shipbuilding Co., and formerly associated with the Oliver-Snyder Steel Co., has been appointed by W. P. Snyder & Co., Pittsburg, as successor to Alexander W. Adair, deceased.

It is reported that T. R. Brown, manager of the Westinghouse Air Brake plant at Wilmerding, Pa., will shortly resign his position on account of ill health. Mr. Brown has been connected with the company for many years and is at present with his family at their summer home on the Hudson near Albany, N. Y.

Edward J. Hamilton, assistant general manager of the Duquesne plant of the Carnegie Steel Co., Duquesne, Pa., has gone to Europe on a three months' vacation.

A. H. Helander, chief engineer of the Colorado Fuel & Iron Co., Denver, Col., spent several days in Pittsburg last week, placing large orders for machinery and contracts for the additions that are being made to the company's plants.

The division superintendents of the American Sheet Steel Co. inspected the plant of the company at Vandergrift, Pa., last week. The party contained Ambrose Beard, of the Eastern Ohio District; W. H. Bailey and F. J. Groth, Canal Dover, O.; S. W. Nicholson, A. C. Andrews, W. L. Junkins and H. M. Steele, New Philadelphia, O.; A. A. Garvey, Dresden, O.; W. E. Ward and A. P. Schonfelt, Canton, O.

George D. Wick has tendered his resignation as president of the Youngstown Iron Sheet & Tube Co., of Youngstown, O. It is probable that Col. Wick intends to retire from active business entirely although this cannot be confirmed at present owing to his absence in Europe.

J. R. Searles has retired from the management of the Fox plant of the Pressed Steel Car Co., Joliet, Ill.

The American Hardware Corporation, of New Britain, Conn., announces the election of A. N. Abbe, of New Britain, as purchasing agent.

Albert Ladd Colby, metallurgical engineer of the Bethlehem Steel Co., sails for Europe on July 29 on business for the company.

Reference has been made in these columns to the resolutions passed by the Foundrymen's Association at Philadelphia, expressing its feeling in view of the removal of Antonia C. Pessano from Philadelphia to Detroit to become president and general manager of the Great Lakes Engineering Works. Another testimonial has recently been engrossed and forwarded to Mr. Pessano from Philadelphia. It embodies resolutions passed at a meeting of the foremen of the various departments of the George V. Cresson Co. They set forth that those present desire "to express in some degree the esteem with which we regard Mr. Pessano as an employer and our admiration for his private character." The resolution recites that "during the many years Mr. Pessano has been identified with the George V. Cresson Co. as our employer we have always found in him a friend who was ever ready to aid us by his wise counsel, and in his retirement we feel that we are parting with a gentleman who, by his kind, courteous manner to all in the employ of the company has endeared himself to each one of us more than language can express."

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The Philadelphia Pneumatic Tool Co. has concluded arrangements for representation in South Africa with headquarters at Johanesburg. This agency will be in charge of Gen. Samuel Pearson, late of the Boer forces. Gen. Pearson was in the United States for some months before the close of the Boer war, in the attempt to have the mule shipments from Port Chalmette stopped. Now that peace has been declared he will return to his former business in machinery lines and will handle the accounts of the Philadelphia Pneumatic Tool Co. and others. Gen. Pearson saw much active service in the field, for a time in charge of railway traffic.

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The Illinois Central Railroad has acquired 34 lots at Memphis, Tenn., at a cost of $125,000 and will commence work on its machine shops. The improvements are estimated to cost $500,000.

## TRADE PUBLICATIONS.

A catalogue of some 96 pages treats at length of the Green improved fuel economizer for steam boilers. This appliance is manufactured by the Green Fuel Economizer Co., Matteawan, N. Y. The publication is profusely illustrated, the details of the device minutely described and the contents of the catalogue are thoroughly indexed.

The Atlas Car & Mfg. Co., Cleveland, has issued Catalogue No. 1012, describing some of the industrial railroad equipment made by this company. It shows only a partial line of cars, turntables, switches, etc., but the company makes cars for all purposes, including mine cars, dryer cars, coal and ore cars, with a varied line of switches, frogs, crossings, portable track, rails, steel ties, etc.

The M. Garland Co., Bay City, Mich., is sending out an illustrated list of band and circular saw mills and special saw mill machinery, patented steel wire cable conveyors, as well as general equipment for saw mills and other wood working industries. There are 158 6x9 pages.

The Avery Stamping Co., Cleveland, has prepared some elaborate blotters printed in colors. A set of these are obtainable on request.

Three circulars have been received from James B. Clow & Sons, Chicago, descriptive of the Clow portable pipe machine for cutting and threading, Triumph water heaters and the Cliamx coupling. The Clow portable pipe machine is capable of operation by belt or power and is sent out with a set of dies cutting from 1 to 4-inch pipe. The Climax coupling is adapted for use in all places where ammonia fittings are employed.

The line of gasoline and gas engines, stationary and portable, manufactured by the Charter Gas Engine Co., Sterling, Ill., is the subject matter of a small catalogue. The engines are shown in combination with pumping outfits, hoisting apparatus, portable wood sawing equipment, etc.

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### Persistency of Railroad Prosperity.

Last week *The Chronicle* published its report of railroad gross earnings for June and for the half year. The increase in gross for the half year was something more than 42 million dollars, for 152 roads having 173,000 miles. This is equal to 0.89 percent. Of course, it is the more significant in that it follows heavy increases every year back to include 1898. The editor thinks that if returns could be had for all of the roads the improvement in earnings for the six months would reach 50 or 55 millions. On some of the individual roads the gains have been enormous; thus the Pennsylvania shows gains in gross for five months of 6½ millions, the Great Northern for six months 3¼ millions, the Canadian Pacific almost 3 millions, the Northern Pacific for five months 2⅔ millions. For the month of June the gain was 7.16 percent, which covers a period of diminished movement in grain, cotton and live stock.—[Railroad Gazette.

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The Midland Machine Co., Chicago, has been incorporated with a capital stock of $50,000. The incorporators are: Adolph Linick, Aaron J. Jones and Sigmund Faller.

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The Excelsior Slugger & Tacker Co., New York, will manufacture boot and shoe making machinery under a recently acquired charter. The capital stock is $500,000.

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I. B. Williams & Sons, who have opened a store at 722 Arch St., Philadelphia, for the sale of belting, lace leather and mill, railroad and engineers' supplies and power transmission machinery, ask that catalogues of manufacturers be sent to their Philadelphia store, also that manufacturers desiring Philadelphia representation write them. The management of the business will be in the hands of Harry S. Huber and Wm. J. M. Weaver.

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At Chattanooga, Tenn., the old Chickamauga Foundry has been sold to Gustafson Bros., who will remodel it, expending about $50,000. The company will manufacture iron and brass castings.

## SUGGESTED AT THE SHOP.

BY F. O. REMAN.

A number of my friends and others are worrying themselves about the metric system. It seems that some of our diligent legislators in the hope of earning their salaries have had a chance to monkey with measures for mechanics. Many men are arrayed on each side of the question and the future of the machinist will simply hang in the balance until everything is adjusted. But he wont worry. I guess not. The matter of measures is an easy thing for him. Will he wilt when Congress shall settle on a metric system of gun measurements? He will go right on building all makes of machinery from corn shellers to cranes, dynamos to cash registers, in his own independent metricless manner.

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If a man wants a machine made to the metric system he can get it. Maybe he wont know the difference, anyway. How is he going to tell? All the difference in that shop would probably be a translating gear or two and nothing more. The splitting of measures is one of the everyday parts of the trade. How is the legislative critic, for example, to know how much difference there is between a "scant" or "full" 1-inch shaft? That would not phase the mechanic a little bit. Probably the nearest approach to the metric system is in the use of the micrometer. It does not get very far, however, and it does not seem to pave the way for the metric system. On the contrary it brings anew the use of other fractions. The old hand will tell you with pride how close the piece is to size. Does he talk of "just a shade large"? Not with the micrometer in hand. Then it is a half, or perhaps, a quarter thousandth out of the way. This is a refinement reserved for his own work or when submitting a judicial opinion on the work of others, something to be done with dignity. The reservation of poise and accurate descernment is the shop right of the micrometer expert.

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I worked for a far-sighted New Englander once. He got up a machine on which he expected to do any amount of business. He could see the machines going out in lots and then the thrifty soul schemed another way to pull money from them. He must sell them to his clients but it was only fair that the repairs should come his way. How is this to be done? A country blacksmith will tackle a repair job on anything from an automobile to a baby carriage. The blacksmith must be curbed. The micrometer machinist must be discouraged so that the old machines will return at length to their birthplace and there, and nowhere else, be made anew. A worm and gear was an essential part of the machine. A special gear was cut for the lathe on which the worms were threaded. An odd job was desired, but would that phase the average machinist when he tackled that combination? He might say things but the puzzle would not kink his better judgment long. The modern machinist, he of the jobbing shop or the tool room in particular, mingles with the unexpected right along. The unusual and the critical task is to him another chance for broadened vision. "Fine work," "Close sizes" a recreative demand upon his shop sense of the eternal fitness of things.

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I suppose that the condemned British inch, two-foot rule and pound weight are behind the majority of machines made today. Even if I am at sea in my estimate of the quantity, it may be that I am saying nothing less than a good share of the truth in claiming a majority of the best machinery as made under other conditions than the metric system. If this is correct then I venture to put in a plea for the hearing of the other fellows. The measurements of the metric system are so close to some whole numbers in the standard yard that even now the tailor or the blacksmith might go ahead and use either. But it would not do for lead screws. The results would not match closely enough to suit my friend of the quarter-thousandths.

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There is nothing new in this suggestion. I believe it was urged by Joseph Whitworth many years ago. He proposed that the metre, which is now equivalent to 39.37 inches (more or less), should be lengthened out about 5/8 of an inch. The metre would then equal 40 inches, and 1 inch would be equal to 25 millimetres. Something of this sort has been done with the French measure of weight. Already by act of Congress 15 grams are reckoned as ½ ounce for postal uses. The exact equivalent is something else, of course, but it shows how the corners can be cut off when a little carving is necessary.

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At this time when the other countries are trying to show how much they value our opinion, and when visitors of high degree are coming here and struggling with the strain of a royal good time, it might be a profitable thing to ask for a general consideration of the scheme by our friends abroad. Even if they don't accept the suggestion, we can. In these expansionist days we should be in favor of stretching the metre to 40 inches rather than any shrinkage of the yard. It is not now claimed that the metre is an even division of the arc of a meridian, and that plea for a so called natural standard does not hold. While we are at the reorganization of standards we might change the 33,000 which figures in horsepower formulas. It has been considered to be too high, if it is based on the continuous performance of the horse. But I have doubts about this when I size up the work of some automobile motors. Assuming that it is so, however, we might cut the figure to 32,000 which would be a much more easily handled affair. About this time, also, would be a chance for getting rid of the 2,240 pounds to the ton; but this last item dies hard.

### New Style of Lake Vessel for Ore Trade.

The improvements in machinery for unloading ore in the past few years have made necessary the changing of the construction of vessels to a certain extent to allow the improved machinery to work to the best advantage. Further changes are needed in view of the latest devices in unloading machinery. Joseph R. Oldham, naval architect, of Cleveland, who has designed many of the steel vessels on the lakes, has obtained a patent for a new design of vessel which he believes will meet the present demand. It is for a bulk cargo vessel with a hold of novel construction, a raised hatch deck and a new type of tank top or upper bottom. The principal object is to give a large, free hold, unobstructed by beams, girders or stanchions. To compensate for the omission of these, he secures the requisite strength by arched girders, which span the hold from bilge to bilge between each pair of hatches. In place of quarter stanchions there are a series of longitudinal arched girders, fitted between bulkheads up to the ends of the hatches.

The vessel is arranged with a large number of hatchways, extending clear across the hold, nearly as far out as the bilges, and so near the hold bulkheads that the discharging buckets will gravitate almost to the extreme end of the cargo on the upper bottom, and the hoisting chains will not be over 10 degrees out of line from a vertical.

The hold, not being encumbered by beams or pillars, will permit the free operation of clam-shell scoops in unloading ore or coal, and it is claimed that the cargo can be cleaned out in much less time than with the old construction. The continual striking of beams and pillars by the heavy buckets has a tendency to bend and weaken them, which, of course, weakens the vessel. This will be obviated. The longitudinal arches will make one or more bulkheads necessary.

The deck is made extra strong by continuous girders between the forecastle and poop, which also form a raised hatch deck the entire length of the ship. Water is not so likely to wash down the hatches in a heavy sea.

The upper bottom is made especially strong, and extends above the bilge, thus giving greater protection in case of grounding. Being extra strong the descending buckets cannot damage it. The weight of the hull will not be excessive, and it is said can be made even lighter without sacrificing strength.

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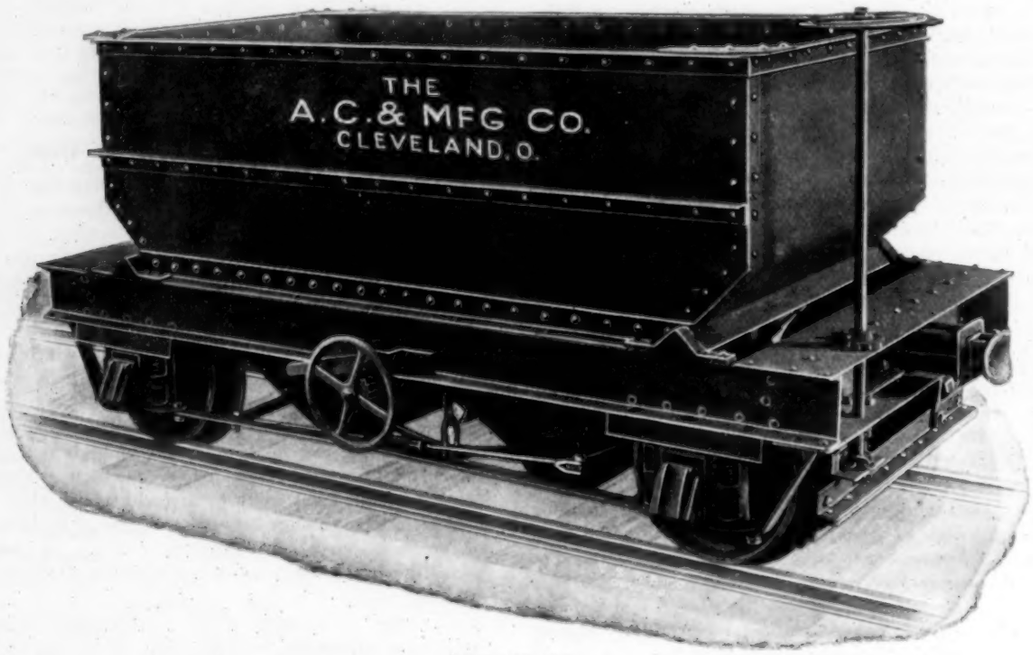
The plant of the Montreal Pipe Foundry Co. was damaged by a fire which started in the Acadia mines. Most of the machinery was saved and the company will be able to continue with little loss of time. New buildings will be erected.

## A NEW ORE CAR.

The ore car shown in the engraving is a new design built by the Atlas Car & Mfg. Co., Cleveland, and will prove of special interest to mining engineers. The car is modeled after the standard railroad car and is built in capacities up to 300 cubic feet. The one shown in the illustration has a capacity of 100 cubic feet and has four wheels for a 36-inch gauge. The object in designing this type of car was to keep the center of gravity as close as possible to the track and from the top of the rail to the top of car the height is only 4 feet 6 inches, and to the center of the drawhead 20 inches. The body is made of ¼-inch steel plates, hard finished and reinforced throughout with angles and gusset plates, the frames being constructed of heavy channels.

There is an ample platform allowed on either end for brakeman to operate the trains and the large capacity cars are equipped with air brakes, the car illustrated having hand brakes. A loaded car can be rapidly emptied by simply raising a pawl and the load is discharged between the tracks. The doors have been carefully designed with tight joints as well as a large free opening so that the outlet will not be obstructed. The wheels are standard 20-inch plate chilled running in malleable iron with internal duplex springs. The large capacity cars are provided with double trucks.




NEW ORE CAR.

The fact that this class of car is subjected to the hardest usage by inexperienced trainmen necessitates rugged fittings and this make of car is supplied with Wright's patent drawheads which are made in steel and malleable iron. The drawheads act as a buffer when the cars come together. This type of car has already proven very efficient in handling ores, limestone, cement rock and other heavy and bulky substances. Of course the general dimensions may be varied to suit individual requirements and the makers are well equipped for producing a large variety of cars for mining and rolling mill equipment. The mine car catalogue, for example, showing over 100 different types and sizes.

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About 3,500 tons of wrought pipe from the National Tube Co.'s mills was forwarded in June through Eastern seaboard points to various parts of the world. Continental Europe was the chief purchaser.

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Among the machine tools now being shown at the American Exposition held at the London Crystal Palace are a 24-inch lathe, a 5-foot radial drill and a 600-pound steam hammer built by the Niles-Bement-Pond Co., of 136 Liberty St.; specialties of the Browne & Sharpe Mfg. Co., of Providence, R. I.; the Cincinnati Milling Machine Co., of Cincinnati; Potter & Johnson, of Pawtucket, R. I.; Norton Emery Wheel Co., of Worcester, Mass.; the Hendey Machine Co., of Torrington, Conn.; Warner & Swasey, of Cleveland; Philadelphia Pneumatic Tool Co., of Philadelphia; and of the Pratt & Whitney Co., of Hartford, Conn.

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The molders employed in the foundries at Louisville, Ky., are considering a strike unless their demands for an advance of 20 percent on the piecework scale is granted. They are also asking for a shop book which the foundrymen absolutely refuse to grant.

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The Kinsey Mfg. Co., Dayton, expects to have its stove manufacturing plant running by the first of September.

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The Briscoe Mfg. Co., of Detroit, purchased on Jan. 1 the Detroit Electric Works property at 1427-47 Woodward Ave. The Caille Bros. Co. will continue to occupy half the building until January, 1903, when the Briscoe Mfg. Co. will come into possession of the entire building. It is of brick, 120x320 feet, and three stories. The Briscoe Mfg. Co. is the new name which the Detroit Galvanizing & Sheet Metal Works took on their expansion early in the year.

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A cablegram from Johannesburg says that the British Trade commissioners in that city announce that large orders will shortly be placed for electric mining plants for the Rand. Merchants are willing to give preference to British manufacturers in placing these orders, but warn those of them who may wish to submit tenders that the machinery must be lighter than their usual models, delivery quicker and prices lower, if they wish to successfully meet American and German competition.

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Cass Harkins, of Columbus, O., a well known manufacturers' agent and consulting engineer, who has been in business in Columbus for a number of years has been appointed sole agent for Central Ohio for the We-Fu-Go and Scaife water softening and purifying systems, manufactured by Wm. B. Scaife & Sons Co., of Pittsburg.

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A number of prominent mining men of the Lake Superior district contemplate attending the annual meeting of the International Mining Congress, which will be held this year at Butte, Mont., commencing Sept. 1.

## POWER REQUIRED TO DRIVE MACHINERY.

Some recent tests made on machine tools and shafting showed that 60 feet of 2-inch shafting, driving seventeen countershafts with from one to three belts each, required 5 amperes to drive at 150 revolutions per minute, the current being supplied at 150 volts.

To cut hard cast iron required 6 amperes, the cut being ½ by 1-16 inches, and the cutting speed 100 feet per minute with one of the new special tool steels.

A 20-inch drilling machine, run without cut, absorbed 1 ampere. A circular milling machine, run on cut, took 1 ampere, and idle it absorbed 0.5 ampere only.

A spur-gear cutting machine requires 0.75 ampere idle, and 1.25 ampere when cutting teeth of about ⅜-inch pitch three at once.

A 6-inch lathe only absorbed 0.25 ampere idle. Except the heavy boring mill with 30-inch table, which did the heavy cast-iron cut, the machines cited were all of light type. Generally, it may be said that machine tools of the light order require very little power to drive them, and there is not much present reason for applying separate motors to them. The 60 feet of shafting cited above was driving 17 machines, all placed on one side of the shaft. It could drive an equal number of machines placed on the opposite side of the shaft, or, say, one machine to each 2 feet of shafting. As the belt pulls would balance on opposite sides, a total current for 34 machines and their countershafts would probably not exceed 8 amperes, or, say, 0.25 ampere per machine. Where machine tools are busy, it will not pay to drive them by separate motors—it will be better to group them on shafting. Nothing, of course, should interfere with the grouping of the machine to secure the best arrangement of work.

Where one shaft drives a number of similar machines, there is some economy to be secured by coupling it up in several lengths, so that in the event of a slack period, or of overtime on a few machines only, the line shaft may be uncoupled beyond the few machines needed. Where it can be arranged, the motor should drive upon the middle of the shaft, but very frequently it is more convenient to arrange the motor to drive from the end. Driving the middle point of a shaft enables its diameter to be reduced in the ratio 1 : $\sqrt{½}$ with reduced friction nearly in the same ratio.

When a shaft drives different kinds of machines, all operating on the same pieces, it may be both possible and convenient for the machines to be mixed together all along the shaft, instead of being grouped in sets of A, B, C, etc. Then at slack periods some of each machine can be driven off one section of the shaft, the remainder of the shaft being uncoupled for economy of power. This point is, of course, to be secondary to shop economy, but may well be attended to if other economies permit of it.

No bevel wheels should be permitted for coupling shafts at right angles. Each shaft must have its own motor. Heavy machines should not be grouped with light machines, especially when the heavy machines are of the reciprocating order, such as heavy planers. Heavy machines of this type demand a heavy current at each point of stroke reversal. They cannot well have fly-wheels, except at the motor side of the driving belt, because the back and forward strokes of the machine are done at different speeds, and a fly-wheel is therefore inadmissible. It is thus proper for heavy machines to have their own motors, while it is also equally proper that a large number of small machines should have one motor only the load on which is rendered more uniform with the number of machines it drives. In textile machinery the speed is constant for long periods at a time in a few machines, and absolutely so in others. It does not vary widely in any.

In machine tool work machines are fitted in themselves for a wide range of speed. Where a motor can be economically run at wide limits of speed, it will enable the machine which it drives to be simplified to a corresponding degree. When arranging for driving a new works, a balance must be struck between the simplification of the machine and of the motor that drives it. As specially arranged machines are at present more difficult to obtain of satisfactory order than standard machines, this should be remembered when deciding upon the system to be employed. With separate motors to each machine, each motor must have a power in excess of the maximum effort of the machine it drives. Consequently the aggregate power of a dozen separate motors will be nearly or quite double the power of a single motor that would drive the dozen machines in a perfectly satisfactory manner. Separate motors are therefore likely to involve an excessive first cost. For the remodelling of existing works, the separate motor will usually be quite out of the running. Fairly modern places may require little else than the removal of present motive powers in favor of electrical motors, the present motive power being perhaps a small steam or gas engine on each line shaft or perhaps a pair of bevel wheels, or a belt or rope pulley. Where enormous economies have been effected by means of electrical driving, the cause must be sought in the widely scattered nature of the works, the comparative fewness of machines, and the great length of shafting, or of more wasteful steampiping, and in the badness of the bearings of the shafting and of the attention, as well as in the low quality of the many small engines employed. But in a textile factory there is but small hope of any economy by electrical driving. Probably about one-fifth the present indicated horsepower could at once be cut out by discarding the main engine and driving each shaft by a separate motor. A really well-driven factory may require 37 tons of coal per 1,000 horsepower per week, or per 800 horsepower delivered to the shafting. The coal bill is, say, £20 per week. The engineer and fireman will still be required to attend to motors and heaters. To supply 800 horse-power for 56 hours per week for £20, will demand that energy must be sold for 0.107d. per horse-power hour for fuel, to compete with the best present steam practice; allow even one-eighth of a penny per horse-power hour, or, say, one-sixth of a penny per unit, and it will be seen that where electrical energy is generated from coal, utilized by means of engines with a poor load factor and distributed by cables, there is but little prospect of its competing with independent high-class steam engines in well-arranged factories of the textile type. But there are undoubtedly many factories that use probably three times the amount of coal of our high-class assumed factory, at 50 percent greater price. Power must therefore cost these factories about 0.5d. per horse-power hour, or even 0.7d. per unit.

For second-class factories electrical energy can be supplied at paying rates, while for certain classes of factories using heavy machines which do not run continuously, electricity can be purchased to show an economy. Every case must be considered on its own merits, but upon the general lines above indicated.—[Electrical Review.

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The property of the Troy Steel Co., Troy, N. Y., will be sold at public auction, after many postponements, on Aug. 7 by Frederick Townsend, referee. It has been idle for several years.

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Ground will be broken next month for the erection of the two blast furnaces of the Buffalo & Susquehanna Iron Co., at Buffalo, N. Y.

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The Cambria Steel Co., Johnstown, Pa., has notified its employes working on the hour rate that their wages were advanced 10 percent on July 1.

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The new plant of the Jackson Iron & Tin Plate Co., Clarksburg, W. Va., has been placed in partial operation. It will be in complete operation shortly and the daily output of tin plate will amount to about 70 tons. There are eight tin mills and six heating furnaces.

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The Pioneer Iron Co. is adding to the force of men and doing all in its power to complete its new furnace at North Marquette, Mich., by Jan. 1.

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J. W. Kohn & Co., Cleveland, located at 71-73 Bolivar St. and on Avon Lane in the rear of the Caxton building, buy and sell second hand machinery and complete factories. Mr. Kohn was formerly a member of the Schneider-Kohn Machinery Co., Cleveland.

# INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

**New Buyers in the Market and Some of Their Wants:—**

A company headed by John F. Budke has purchased the old plant of the American Tin Plate Co., at Canonsburg, Pa. The plant was ordered dismantled some time ago. The plant contained five mills and was ordered closed some time ago. The price paid for the mill was reported to be $125,000. The new company will capitalize at $250,000. It is stated that the new company will install eight tin mills in the old plant.

From Clarksburg, W. Va., it is reported that the Standard Motive Power Co., with a capital of $1,000,000 will erect a plant for the manufacture of locomotives.

The Marion Gray Iron Foundry Co., of Marion, O., has been incorporated with $10,000 capital to operate a gray iron foundry. J. H. Shaumleffel, J. F. Digan and M. F. Gartland are the incorporators.

The United States Fence Co., of Portland, Ore., has been incorporated with $15,000 capital for the purpose of operating a wire fence plant.

The Quincy Electric Drill Co., Quincy, Mass., has been incorporated with a capital of $500,000 to manufacture electric drills. The incorporators are: George F. Bradstreet, of Boston; Richard M. Farries, Jersey City, and Herbert L. Keyes, Hackensack, N. J.

The Union Machine Co., of Zanesville, O., has been incorporated with a capital of $25,000.

A. H. Smith, 140 W. Seneca St., Oswego, N. Y., wants a 4-ton hoist for building purposes.

The Standard Machine Co. with principal office at 16 Exchange Place, Jersey City, has been incorporated with a capital of $100,000 to manufacture machinery.

The C. Hafers Iron Works, of New York, has been incorporated with $20,000 capital. Christian Hafers, J. A. Hedstrom, and J. W. Heimbuch are the incorporators.

The Economy Brake Shoe Co., of East St. Louis, Mo., has been incorporated with $100,000 capital to operate a foundry for the production of brake shoes. Albert Waycott, E. S. Marshall and F. F. Rose are the incorporators.

The Phillip Pressed Steel Co., Joliet, Ill., has been incorporated with $25,000 capital for the purpose of manufacturing pressed steel casks. The incorporators are Grant Houston, C. F. Haley, R. Gorham, J. E. Phillip, J. C. Flowers, C. B. Garnsey and P. G. Rulien.

The Ridgway Machine Tool Co. has been incorporated at Ridgway, Pa., with $300,000 capital.

The American Rock & Metal Co. has been incorporated at Denver, Colo., with $100,000 capital. W. S. Ward, H. E. Wood and S. D. Walling are the incorporators.

The Oxmoor Furnace Co., of Birmingham, Ala., which has been incorporated with $100,000 capital is about to acquire the two furnaces operated at Oxmoor, Ala., by the Tennessee Coal, Iron & Railroad Co. Terms have been agreed upon and the deal only requires the ratification of the directors of the Tennessee company. It is the policy of the latter company to centralize its operations in the Birmingham District and for that reason it is found desirable to dispose of the Oxmoor property. The new company will put one of the furnaces in operation as soon as the necessary repairs can be made and the second furnace will also be overhauled preparatory to going in operation. The two furnaces have a daily capacity of about 270 tons. T. T. Hillman, G. B. McCormack, Erskine Ramsay and James Bowron are the principal stockholders. The last three were formerly officers of the Tennessee company.

The Edward H. Little Co., of New York, has been incorporated with $2,000 capital for the purpose of manufacturing stamped galvanized ware. E. H. Little, A. W. Little and E. Little are the incorporators.

The West Shore Stove Co., New York, has been incorporated. The capital stock is $1,000,000 and the directors are: Curtis C. Bean, J. B. Conkling and Albert Schmidt, New York.

The Canadian Pneumatic Tool Co., Ltd., Montreal, Can., has been incorporated with $50,000 capital. S. A. Stephens, J. H. Elliott, F. P. Jones, S. A. Stephens, Jr., and E. A. Stephens are the incorporators.

The Gerling Mfg. Co., Edwardsville, Ill., has been incorporated with a capital stock of $50,000 and will make machinery and farm implements. The incorporators are: Chas. H. Gerling, W. S. Neunschwander and J. W. Garnett.

M. H. Treadwell & Co., 95-97 Liberty St., New York, have recently removed their estimating department to their Lebanon, Pa., works, and catalogues, price lists and other matter relating to engineering, foundry or special machinery should be sent to Lebanon.

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**Fires and Accidents:—**

The brass foundry of the Charles Parker Co., Meriden, Conn., was recently destroyed by fire, with a loss of $5,000.

The plant of the Johnson Foundry & Machine Co., Paducah, Ky., was burned last week. Loss, $15,000.

Fire in the foundry operated by Josiah Thompson & Co., Philadelphia, Pa., caused a loss of $100,000.

Carter Bros.' foundry at Manson, Wis., was destroyed by fire. Loss, $2,500.

Part of the plant of the John A. Roebling Sons Co., Trenton, N. J., was destroyed by fire July 20, the loss being nearly $100,000. The cable braiding shop, which was 200 feet long, was burned to the ground.

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**New Construction:—**

J. C. Cornthwaite, formerly manager of the Pacific Coast Iron Foundry, at Ballard, Wash., has decided to erect a foundry and a machine shop. A site has already been secured and the erection of the foundry will be commenced shortly.

A four-story addition 20x98 feet is being erected at the plant of the Branson Machine Co., Philadelphia, Pa.

The Empire Wire Co., Utica, N. Y., is adding an annealing department, 40x35 feet.

The Springfield Boiler Co., Springfield, Ill., is contemplating the erection of a 500x100 feet addition to its plant. A machine shop 50x75 feet has just been completed.

The Matthews Steel Casting Co., Muncie, Ind., recently organized with a capital of $100,000 has plans prepared for a foundry 62x225 feet. The engine room will be 30x61 feet and the sand and core buildings will be 20x60 feet each. The daily capacity of the plant will amount to about 30 tons.

The Franklin Rolling Mill & Foundry Co., Franklin, Pa., has decided to erect a finishing mill 75x330 feet; boiler house 50x60 feet; foundry 100x300 feet. The company will manufacture metallic poles for trolley, electric and telegraph purposes and has purchased the patents of the Electric Tripartite Steel Pole Co., of New Jersey. The rolling mill will contain three stands of three-high 18-inch mills for the rolling of the shapes from which the poles are constructed. The power house will be equipped with a 600-h. p. engine and boiler plant of the same capacity. There will also be a 200-h. p. electric light plant. The plant will be located on a site of about 12 acres affording sufficient room for enlarging the works. The foundry will be equipped for the production of malleable and gray iron castings and this branch of the industry will be operated separately from the rolling mill end. Samuel Diescher & Sons, Pittsburg, Pa., are the engineers. The officers of the company are as follows: Capt. C. W. Mackey, president; J. W. Rowland and Gen. Charles Miller, vice presidents; O. D. Bleakley, treasurer; E. E. Hughes, secretary, and G. V. A. Conger, manager.

Joseph Wharton, of Philadelphia, has purchased 3,800 acres of coal land near Graceton, Indiana County, Pa., and has commenced building a small mining town to be named Coral. To the 24 coke ovens now in operation 126 will be built immediately and it is probable that 150 will be built later. A number of washers are also being erected.

The Eastern Steel Co., which has secured the properties of the Pottsville Rolling Mills, Pottsville, Pa., has already commenced work on dismantling portions of the plant and making repairs to the remainder. The entire open-hearth department is to be dismantled and a new plant will be built to contain two furnaces which will later be supplemented by two additional furnaces. The blooming mill will also be overhauled. The old Pioneer stacks which have been idle for a number of years are also to be overhauled and prepared for

operation. Stack No. 3 will be repaired first and repairs will then be made on stack No. 2. Contracts have already been made for securing Cuban ores.

The Atlanta Rolling Mill & Tin Plate Co., Atlanta, Ind., is erecting a tin plate plant to contain six hot mills and four cold mills. Contracts have been awarded for one 1,250-h. p. engine to be built by the Bass Foundry & Machine Co., Fort Wayne, Ind., as well as a battery of eight 125-h. p. boilers with stoker attachment. The shears to be installed will all be electrically driven and the remainder of the machinery will be the most modern obtainable.

Considerable progress is being made in the erection of the new addition to the plant of the Ohio Falls Iron Co., New Albany, Ind. The main building is 220x340 feet and it will contain nine scrap furnaces, five scrap shears, one 12-inch guide mill with 16-inch roughing train, one 5-ton steam hammer, 20-inch three-high muck mill, 60-inch squeezer, all to be operated by a 28x48 Corliss engine with a 50-ton flywheel.

Ground has been broken for the erection of the 250-ton blast furnace to be erected by the Tacoma Steel Co., Tacoma, Washington. The plans also provide for an open-hearth plant and finishing mills but plans are still incomplete.

Sidney Shepard & Co., Buffalo, manufacturers of sheet metal goods, will erect three new buildings, each five stories high, 100x80 feet, and fireproof.

The Minneapolis Steel & Machinery Co. will spend $94,800 in improvements on the old harvester works in South Minneapolis and in new buildings. The new buildings will include a machine shop, a foundry, an office, a steel and structural shop, a storage shed, a boiler room and a barn.

Rapid progress is being made on the plant which the American Tube & Stamping Co. is building at Bridgeport, Conn. The main building is 610 feet long and 110 feet wide. A machine shop, 450x90 feet, is being erected. The boiler house will be 50x125 feet and boilers with an aggregate capacity of 200 horsepower will be installed. The blooming mill will be 275 feet long.

A plant to cost $300,000 for the manufacture and repair of locomotives and freight cars will be established at Ballard, near Seattle, Wash., with a capacity of 72 locomotives and 900 freight cars a year. The company is the Aetna Locomotive & Machine Co. and is organized with E. C. Hawkins as president and George J. Danz, secretary and treasurer. The capital is supplied largely in Seattle, but partly from the East.

The Thew Automatic Shovel Co., of Lorain, O., has just completed an extension to its building which will increase the capacity 50 percent.

The McGahey Engine Co., of Elkton, Va., will build a new foundry and a machine shop, each 80x140 feet. They will be equipped with modern tools for the manufacture of the new automatic Corliss engine invented by C. R. McGahey.

The Toledo Railway & Light Co. will erect car shops and storage buildings at Toledo.

R. A. Cook, of the Central City Iron Works, Stevens Point, Wis., will expend about $25,000 for the enlargement of his foundry and machine shop.

The plant of the John Rice Foundry & Machine Co., at Stevens Point, Wis., will be enlarged.

The Commonwealth Steel Co., St. Louis, is making excellent progress in the erection of its new plant at Granite City, Ill., for the manufacture of steel castings. It is expected that the plant will be in operation by Sept. 1. In the open-hearth plant, the furnaces will be of a special design adapted to oil or gas. They will be of the basic type. The annealing furnaces will be equipped with double combustion oil burners.

A six-story brick and steel industrial building will be erected at Syracuse, N. Y., at a cost of $200,000.

The Atlanta Car Wheel Co. will erect a car wheel factory, 120x230, at Atlanta, Ga.

The Whitaker Iron Co., Wheeling, W. Va., is adding three more sheets mills to its plant.

The Hendey Machine Co., Torrington, Conn., has awarded a contract for a three-story addition. It will be of brick, 63x120 feet.

The Myers Furnace Co. will erect a new plant at Peoria, Ill., 82x175 feet.

The McClary Mfg. Co., London, Ont., will build a new plant. The foundry will be 230x200 feet, mounting shop, 300x75 feet, and there will be a power house and storage and polishing shop.

The Clipper Plow Co., Defiance, O., is erecting an addition to its plant, putting up a building 130x80 feet, which will be used as a storehouse and shipping room. The building formerly occupied for this purpose will be converted into a foundry and grinding department, which will greatly increase facilities and at the same time enable the company to handle its product more economically.

Official announcement has been made that the Pennsylvania Railroad proposes to erect a large plant at Altoona for repairing steel cars. It will be a steel building 70x300 feet, equipped with all the modern machinery required in this kind of work. The cost is estimated at $200,000. The plant will employ about 500 men, and will be completed in the late fall.

The Columbus Edison Electrical Co., Columbus, O., has purchased a site opposite its plant and will build an addition.

A new factory building will be erected by the Hayden-Corbett Chain Co., Columbus, O. It will be of brick and one story.

The Pioneer Stove Co., Columbus, O., will build a factory 75x200 feet, about half of the structure being three stories while the remainder will consist of one story and a basement.

The Phoenix Iron Works, Portland, Ore., will erect a machine shop, two stories high, 100 feet long and 70 feet wide; foundry 60x80 feet and a pattern shop 30x50 feet.

The Malleable Iron Fittings Co., Hartford, Conn., will erect a large annealing department 200x118 feet.

The Hollidaysburg Iron & Nail Co., Hollidaysburg, Pa., is erecting a large addition to its plant to include a finishing mill 100x200 feet. This department will be equipped with a bar and guide mills, nail plate mill and a rail mill for rolling rails up to 40 pounds. Four heating furnaces will also be added. Twenty puddling furnaces are also to be added to the puddling department.

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**The Pittsburg District:—**

The Clearfield Steel & Iron Co., of Pittsburg, has been organized with a capital of $200,000 and a Pennsylvania charter applied for, for the purpose of erecting a large rolling mill at Clearfield, Pa. The plant will contain 24 puddling furnaces, an 18-inch bar mill, 9-inch guide mill and a rail mill for rolling rails up to 30 pounds. The plant will also contain a 52-inch squeezer. The main building will be 360x220 feet in dimensions and will be built entirely of steel. The contract for its erection has been awarded to the Fort Pitt Bridge Co. The company has also optioned about 150 acres of coal land. Charles Hyde will probably be president and H. L. W. Hyde, treasurer. Nearly all of the contracts have already been awarded and the work of erection will be commenced immediately.

The strike of the melters and steel workers in the Crescent and Black Diamond plants of the Crucible Steel Co. of America, Pittsburg, Pa., has been settled, all the men returning to work last week. The men received advances averaging from 2½ to 5 percent. The men employed at the Singer, Nimick & Co., LaBelle and Aliquippa plants are still on a strike but it is probable that a settlement will be shortly affected.

The Follansbee Bros. Co., Pittsburg, has located its new sheet and tin mill on a site of about 200 acres five miles above Wellsburg, W. Va., on the Ohio River. The location is almost opposite Mingo Junction, O. The erection of the plant has already been commenced and it is the intention to hurry the construction so that operations can be commenced about the first of the year. The plant will contain four sheet mills and four tin mills. The tinning department now operated by the company in Allegheny, will be removed to the new site within a few months. The company does a large jobbing trade in Pittsburg and vicinity in both tin plate and sheets. The capitalization is $800,000.

Hyde Bros. & Co., manufacturers of the Hyde Water Tube Safety Boiler are erecting boilers at present in Canada, Alabama, Missouri, Pennsylvania, Ohio and Maryland. The capacity of these plants aggregates more than 5,000-h. p.

Extensive improvements are under way at the Isabella Furnace plant of the American Steel Hoop Co., Pittsburg. The two stacks are being practically rebuilt and their capacity is being increased from 250 to 400 tons per day. Ore bins are also being constructed for the handling of the ore in the

latest and most improved methods. The furnaces will be in operation in August or September.

The Coshocton Iron Co. will be incorporated under the laws of the State of Pennsylvania on August 12 with $75,000 capital for the purpose of operating a foundry, the entire output to be used by the Liggett Spring & Axle Co. The latter has decided to erect a large spring and axle plant on the banks of the Monongahela river, opposite Monongahela City, Pa., and the foundry will adjoin this plant. Work on both plants will be commenced immediately.

The Pennsylvania Tool Works Co., with a capital of $125,000, has been incorporated under the laws of New Jersey. The incorporators, Milton S. Zortman, F. H. Brown and Robert Wray are all members of the Brown & Zortman Machinery Co., of Pittsburg, and while they are not yet prepared to state the purpose of the new company it is probable that a plant will be erected for the manufacture of machine tool specialties.

The Pittsburg Fuel Saving & Furnace Co., of Pittsburg, has been incorporated under the laws of New Jersey with $100,000 capital for the purpose of engaging in the manufacture of a smoke consumer for locomotives and stationary engines. F. J. Hughes is president of the company; W. K. Brown, secretary; C. K. Bruce, treasurer, and G. M. Hughes, general manager.

The John Dunlap Co., of Pittsburg, will erect a large tinware factory at Carnegie, Pa. Two buildings, each three stories high, will be erected, the one 70x250 feet and the other 40x250 feet. The company is in the market for a large amount of equipment including presses and tinware manufacturing machines.

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**General Industrial Notes:—**

The molders employed by the Tacony Iron Works, Tacony, Philadelphia, Pa., have gone on a strike on account of the refusal of the company to grant them an increase of 15 cents per day as agreed upon with the National Foundrymen's Association some time ago.

Mary Furnace, operated by the Ohio Iron & Steel Co., Lowellville, O., has resumed operations after a period of extended idleness.

It is reported that the New Castle, Pa., plant of the American Steel & Wire Co. will resume operations within a few months. Since the steel capacity of the New Castle plant of the National Steel Co. has been increased, the rod mills of the American Steel & Wire Co. will be able to secure steel at a less cost than heretofore when the material had to be brought from mills outside of New Castle for rolling into rods.

The strike of the molders employed at the plant of the Niles Tool Works, Hamilton, O., has been declared off. The men returned to work on former terms.

At the annual meeting of the stockholders of the Ashland Sheet Mill Co., Ashland, Ky., held last week, officers for the ensuing year were elected as follows: Ironton A. Kelly, president; T. J. McCullough, vice president; L. R. Putnam, secretary, and George McCullough, treasurer. The sheet mill has been placed in full operation this week after an idleness of several weeks for repairs.

The Newport News Shipbuilding & Drydock Co., Newport News, Va., has purchased the foundry of the Peninsula Foundry Co. S. J. Wright, the former owner of the plant, will continue as superintendent. Some time ago the shipbuilding company purchased the Caskey foundry located at the same place.

A number of non-union men have been put to work at the Pennsylvania Engineering Works, New Castle, to take the place of striking machinists, but some have been pursuaded to leave and the strike is not yet broken.

The Herschel Mfg. Co., Peoria, Ill., has decided to remove its plant to a new location owing to the hostility of the city council of that place. The company manufactures farming implements.

Furnace workers at the Seneca and Cherry Valley stacks at Leetonia, O., organized two weeks ago and asked for an advance to correspond with the scale of the Mahoning Valley iron workers. The men had arranged to go out last week, but both companies signed the scale and a strike was averted.

The O. S. Platt Mfg. Co., Bridgeport, Conn., has filed a certificate of dissolution. The corporation was organized in 1896 for the manufacture of castings and electrical appliances.

The Noble & Wood Machine Co., Hoosick Falls, N. Y., which was formed to carry on the business of the Noble & Johnston Machine Co., whose plant was burned last March, is better equipped to do business than was the old company, having considerably more capital and a strong board of directors headed by Mr. James A. Noble, who was the moving spirit of the old company and who remains as general manager of the new company. The new plant which has been in course of construction since May 1, is on a considerably more extensive scale than before and good progress is being made so that in a couple of months more it will be in full running order. During the building of the new plant regular customers have been cared for by running a part of the machinery under a temporary structure.

The William Tod Co., Youngstown, O., has placed contracts for three large cranes to be installed in the new plant now under erection. The largest crane has a 70-foot span and is of 60 tons capacity. It will be installed by the Brown Hoisting Machinery Co., of Cleveland. A crane of 10 tons capacity will be installed by the Youngstown Engineering Co., Youngstown, O., and a 5-ton crane will be installed by the Whiting Foundry Equipment Co., Harvey, Ill.

The Franklin Furnace, Franklin P. O., Oneida County, N. Y., resumed operations several days ago after a period of extended idleness. The furnace has been relined and many improvements have been made. A crusher has been installed at the mines of the company and the ore will be crushed before entering the furnace.

The Lukens Iron & Steel Co., Coatesville, Pa., has purchased 80 acres of ground for extensions. It is stated that blast furnaces will ultimately be erected.

At the annual meeting of the Youngstown Foundry & Machine Co., Youngstown, O., held last week, directors were elected as follows: Thomas Parrock, W. J. Wallis, Frank A. Williams, E. Hartzell, William Farr, J. E. Kennedy, Charles Spatholt, Fred Andress and George Higley. Thomas Parrock was elected president; W. J. Wallis, vice president; Frank A. Williams, secretary and treasurer. The annual report was most satisfactory.

The new wire nail department of the New Castle, Pa., plant of the Cuyahoga Steel & Wire Co., Cuyahoga Falls, O., will be placed in operation about Sept. 1.

Extensive improvements are being made at the tin plate plant of Lalance & Grosjean, Harrisburg, Pa.

Progress is being made on the erection of the new plant of the Baltimore Rolling Mill Co., Baltimore, Md., and it is probable that the plant will be placed in operation in about 90 days. Two merchant mills are being installed.

The new brass foundry erected by the North & Judd Mfg. Co., at Hartford, Conn., has been placed in operation. Saddlery fittings will be manufactured.

The Reese-Hammond Fire Brick Co., of Bolivar, Pa., with works at Bolivar, Fairmont and Curwensville, has secured the fire brick contract for the large new blast furnace and four hot blast stoves being erected by Julian Kennedy for the Rochester & Pittsburg Coal & Iron Co., at DuBois, Pa. The Reese-Hammond Co. recently furnished the brick for a blast furnace for one of the United States Steel Corporation's plants and within four months has secured orders for six blast furnaces and eight Kennedy hot blast stoves. The company also received a contract from the Union Steel Co. for brick for the new open-hearth plant and other furnace work under way at Donora, Pa., amounting to about 7,000,000 high grade fire brick, these coming from the Curwensville works in Clearfield County. The capacity of the Curwensville works is being increased to 75,000 high grade fire brick per day, and several miles of mine railway and other extensive improvents are under way. The Reese-Hammond Fire Brick Co. has almost completed its new No. 1 works at Bolivar, which replaces the one destroyed by fire in March. The new plant is a brick structure, 50x312 feet, two stories high, modern in all its equipments, and will have a capacity of 30,000 bricks per day. It is to be used for the manufacture of high grade refractories exclusively. The total capacity of the company's seven plants, including all classes of high grade refractory and other clay products, reaches 285,000 bricks per day.

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Perform the same service for an engine's steam supply that a reservoir performs for a town's water supply—they provide a means for meeting any sudden or momentary demand for a large quantity of steam. They assist in reducing the drop in pressure which sometimes occurs between the boiler and engine (due to small pipes) and also stop pulsations in the pipes.

Besides giving protection at all times from water carried with the steam (thus averting breakdowns), a **Cochrane Receiver Separator** ensures a higher and steadier initial pressure, because while the engine is taking steam for, say, ¼ to ½ of the stroke, the receiver (which, to a large extent, supplied the steam for the first portion of the stroke) is being fed from the boiler during the WHOLE of the stroke.

HARRISON SAFETY BOILER WORKS

Clearfield and 17th Sts. PHILADELPHIA, PA.

Cochrane Receiver Separator. Angle Form.

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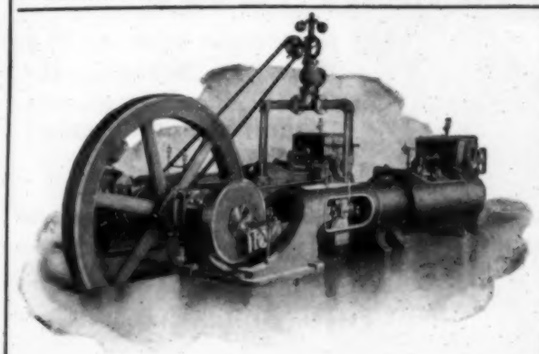

Are made of the Straight Line and Duplex types; Single and Multiple Stage Compression; Steam actuated with simple or compound Steam Cylinders, or belt driven, for operating Pneumatic Tools, Hoists, Mining Purposes, Pumping Water, Elevating Fluids, etc.

We also make Stilwell Feed-Water Heaters, Steam and Power Pumping Machinery, and the Victor Turbine Water Wheel. For prices, address,

The Stilwell-Bierce & Smith-Vaile Co., M. O. B. 227, DAYTON, OHIO.

## TIN PLATES

*Coke Charcoal Roofing*

*Galvanized and Black Sheets*

*The J M & L A OSBORN CO.* CLEVELAND COLUMBUS

### TOOL STEEL BALLS

We have the largest and best equipped ball making plant in the world. Regular stock sizes from 1/16 to 4 inches. Write for catalogue.

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CLEVELAND BALL AND PEDAL FACTORY
CLEVELAND, OHIO.

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Steel drive chains for power transmission—block, roller, cable or balancing, and tubular rivet chains. . . Write for catalog.

THE AUTOMOBILE AND CYCLE PARTS CO.
DIAMOND CHAIN FACTORY
INDIANAPOLIS, IND.

**The Elastic Nut Track-Bolt**

**makesthe best and cheapest rail-fastening. NUTS NEVER WORK LOOSE. Requires no nut-lock. Our Elastic Self-Locking Steel Nut always stays, and is superior for use on Cars, Track, Bridges, Machinery etc. Write us for prices on Sq. and Hex. Nuts, (Elastic or Common) Machine Bolts, Track Bolts, Rivets, etc.**

**NATIONAL ELASTIC NUT CO., MILWAUKEE, WIS.**

**PERFORATED PLATE SCREENS**

AS REQUIRED FOR

Stone, Ore, Zinc, Lead, and all Railroad and Mining Uses.

SPECIAL SCREENS FOR COAL AND COKE.

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Samples and information upon request. Carbondale, Pa.

**Do You Seek Trade With the Foundries?**

THERE are 5,933 foundries in this country and Canada.

1,055 of these are new concerns which have come into existence during the past two years. More than 600 foundries quit business during the same period.

The chances are that your mail matter does not reach all of the new firms. It is also a safe proposition to gamble that you are sending out letters right along to people who have quit the foundry business.

The way for you to cover the foundry trade completely is to have a copy of

**Penton's Foundry List**
**FOR 1902**

in your office. This is the only reliable directory of foundries published. It is now ready for delivery. Only a limited edition will be printed, so you had better order a copy early.

The salesman on the road says that with a copy of this list in his pocket he can get over the ground in half the time and see everybody. Without it he is looking up people who have no foundries and missing others who have. It will be money in your pocket to see that your men have a copy.

**The Iron and Steel Press Co., Pubs.**
**CLEVELAND, O.**

**Allis-Chalmers Co.,**
**CHICAGO.**

**Perforated Plates**

**for Incline Shaking and Revolving Screens for Coal Washing and Cleaning, and all other purposes.**

**Write for Prices.**

**The "ORIGINAL GANDY"**

**STITCHED COTTON DUCK BELTING,**

Especially adapted for Main Drivers, Saw Mills, Cotton Gins, Cotton Presses, and for all places where belts are subjected to moisture or atmospheric changes, the "GANDY" stands paramount.

For further information, prices, etc., write

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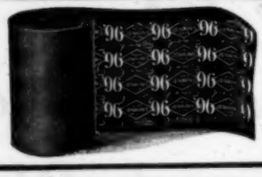


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Makes perfect joint instantly; does not have to be followed up. Makes joint that will last for years on all pressures of steam, oils, acids, etc. Does not rot, burn, blow or squeeze out. Received the highest award—Gold Medal—at the Pan-American Exposition. All genuine stamped with Trade Mark.

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***KEEP'S "CAST IRON."***

MR. KEEP is well known to the readers of *The Iron Trade Review*.

His writings on the subject of regulating mixtures of cast iron through the medium of mechanical analysis, otherwise known as *Keep's Test*, have been of unusual interest.

In his new book, "*Cast Iron*," Mr. Keep relates his experiments and researches in the field of cast iron. It is a work which every foundryman who desires to produce the best grade of castings at the least cost should have at his command. Two dollars and a half secures it.

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1064 Rose Bldg., CLEVELAND, O., U. S. A.

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## FAST PUMPING.

You may not need a pump that will work at high speed all the time, but when you do require an extra volume of water how handy it will be for you to have a pump which will get there. The **Blakeslee Duplex** is such a pump; it has large direct water passages and full valve areas, which permit high speed. All parts of it are easily removable, and may be replaced at a nominal cost, should they from any cause become damaged. In short, the **Blakeslee** is a perfect pump, and we would like to have you look into its good points. Our catalogue is an interesting piece of pump literature, and is sent free.

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From Rust, Fire, Sun, Water and Weather by using our products. . .

**Pure Red Lead**

Kept from settling by our **Double Oxygenized, Pure Linseed Oil.**

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ESTABLISHED 1855

*Who Builds the best Mine Pump?*

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That cannot Fail.

Highest Award Pan-American Exposition

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*FOR ALL POSSIBLE PURPOSES* made as they should be.

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Improved Washers with steel or wood logs. Screens, cylindrical and conical of all descriptions. Steel, slow moving elevators and conveyors. Picking Belts for coarse material and hard usage. Friction Hoists. Single Roll Crushers for rough crushing in large quantities.

**CASTINGS of every DESCRIPTION. ESPECIALLY HEAVY ONES.**

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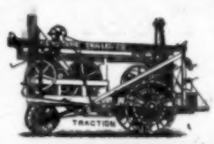

**FOR TESTING IRON ORE BODIES**

or drilling deep test holes in ANY formation—gravel, boulders and rock. Drives 4, 6, 8 or 10-inch pipe, and drills holes that size in rock, and **Produces at the Surface Everything Found.**

Tests for gold, lead, zinc, coal—everything. Can be used on boat, to explore river beds to bed rock. Water no hindrance. Drills water and oil wells quickly cheaply and without skilled labor. Self-moving; complete. Write for full information and catalogue.

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SET, CAP and MACHINE

Hexagon Nuts, Studs, Etc. **SCREWS.** Coupling Bolts Specials.

No. 2 N. Canal St., - - CHICAGO.

If you want an automatic stoker that is entirely automatic.
If you want to save labor and cost of firing.
If you want to be able to burn a cheap coal instead of a high grade.
If you want smokeless combustion.
Then you want the

**Green Traveling Link Chain Grate.**

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Get our complete catalogue. CHICAGO, ILL.

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FOR THE LEAST FUEL
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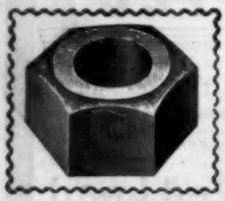

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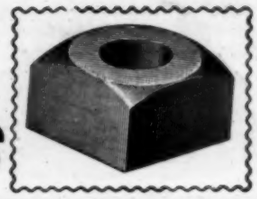

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*Also Every Variety of*

*Machine Bolts, Nuts, Washers, Turnbuckles, Lag Screws*

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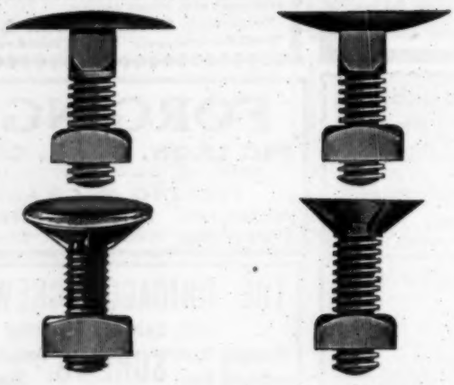

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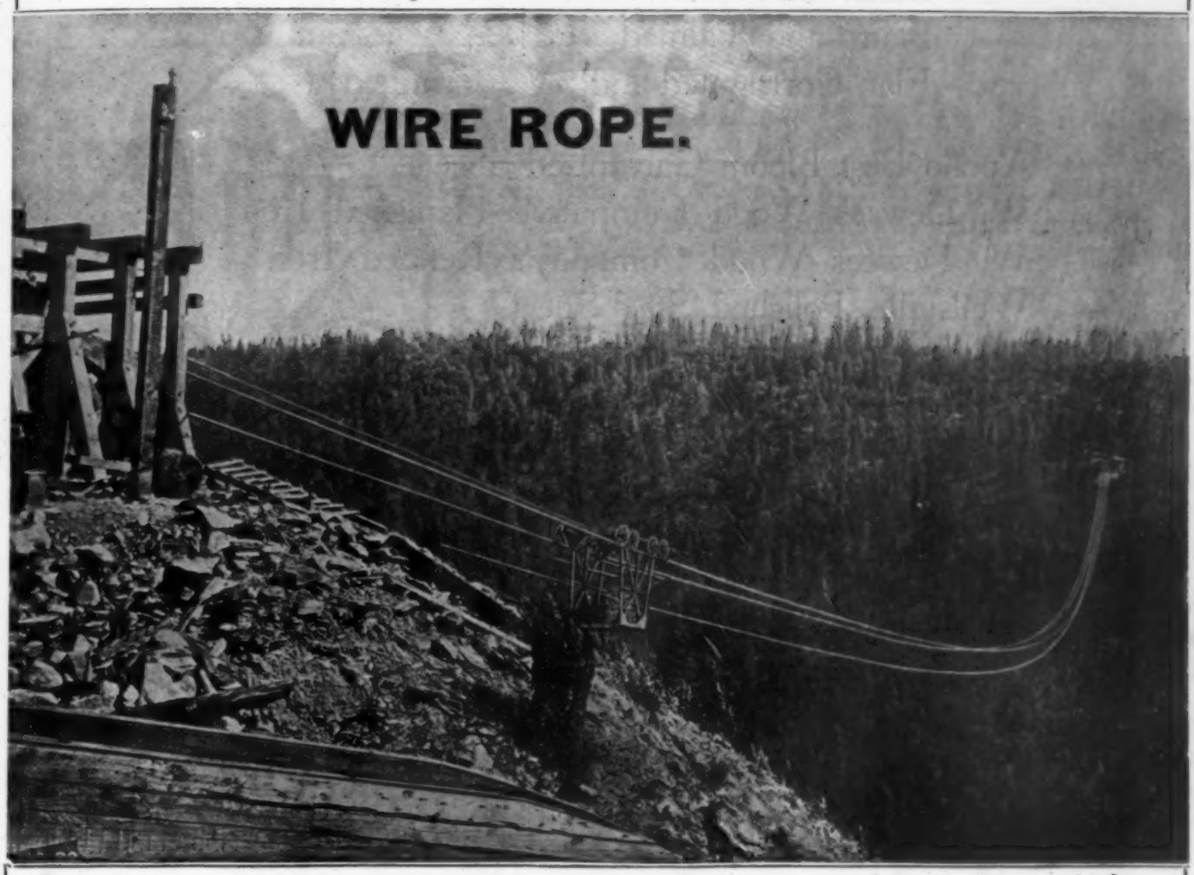


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**NAILS, STAPLES, SPIKES and TACKS.** Standard Wire Nails in all sizes and shapes. Miscellaneous Fine Nails. Tacks in count and weight packages. Dowel Pins.

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IT DOES if you use the ALUMINUM COATED.

Some of our customers are using it as a substitute for copper.
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THE IRON TRADE REVIEW, Cleveland, O.

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Wire Straightened and Cut to Lengths.

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THE IRON TRADE REVIEW,
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**INSPECTED FOUNDRY IRON**

that is soft and strong and uniform and shows greatest fluidity—price is yours for the asking—originated and made only by

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Steel Billets and Slabs, both Bessemer and Open Hearth, Pig Iron, Manufactured Steel, &c.

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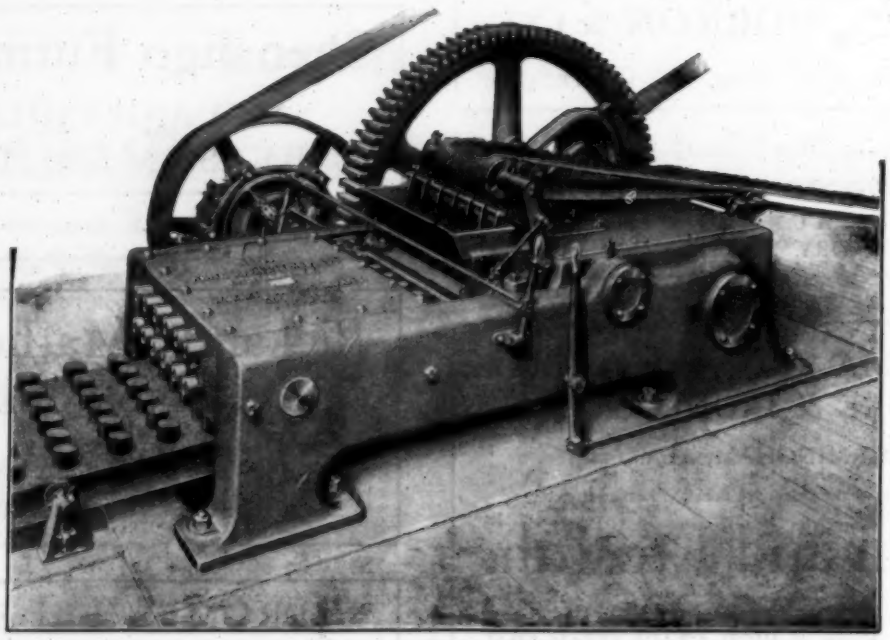

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